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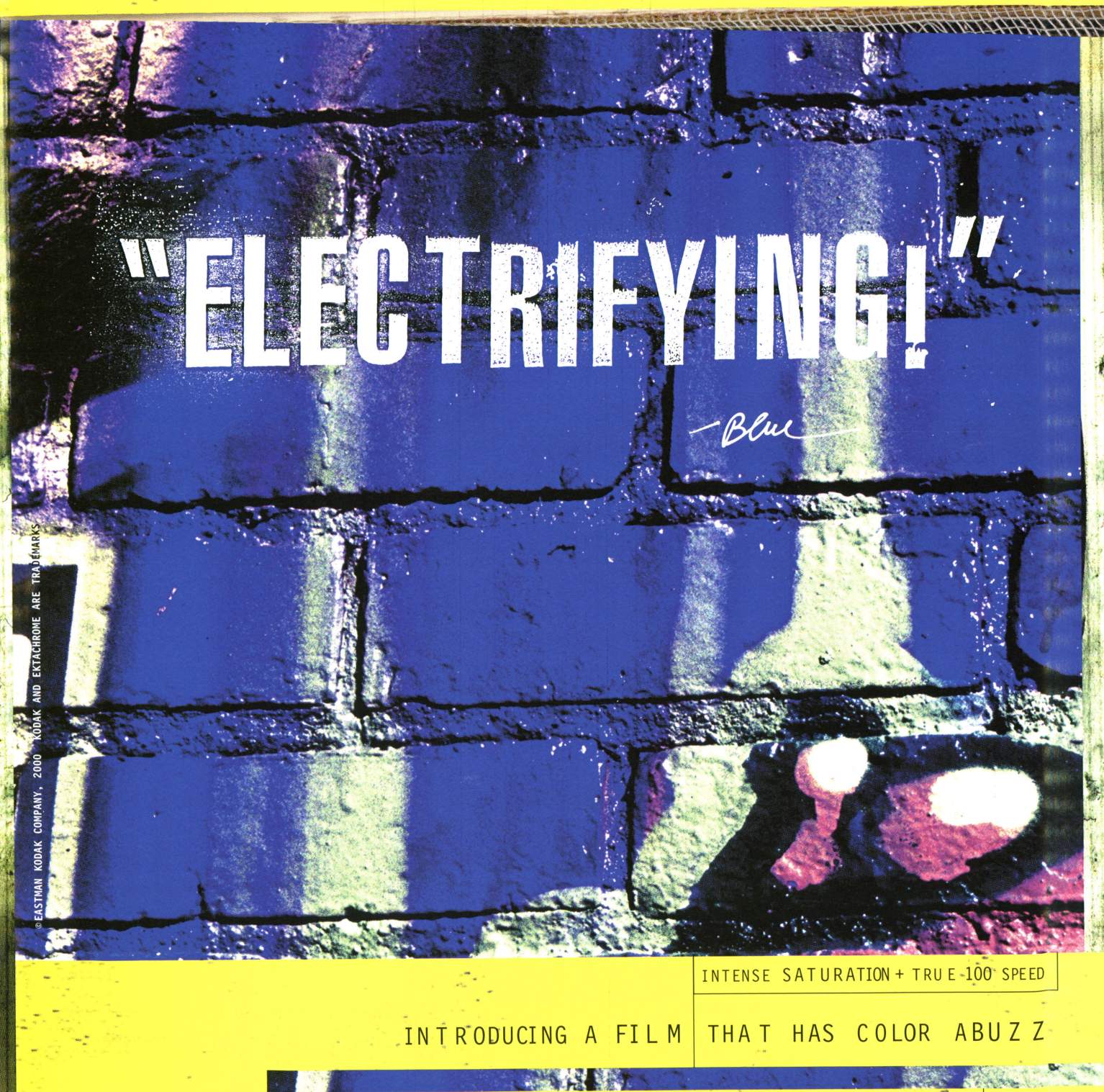


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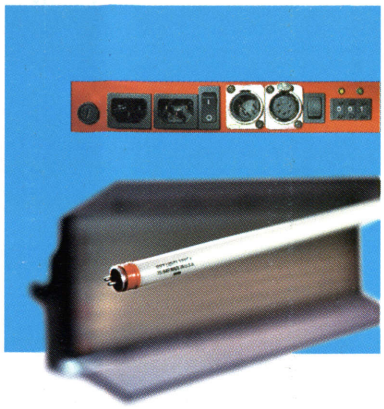
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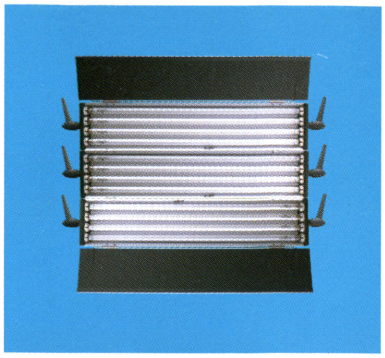
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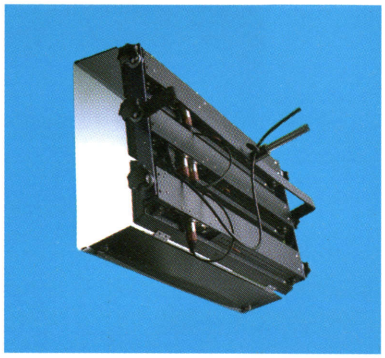
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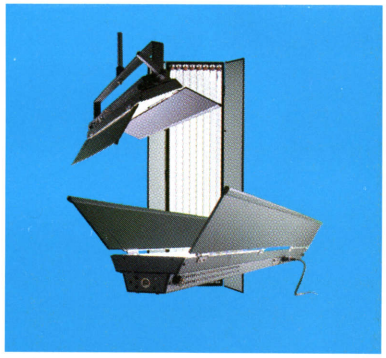




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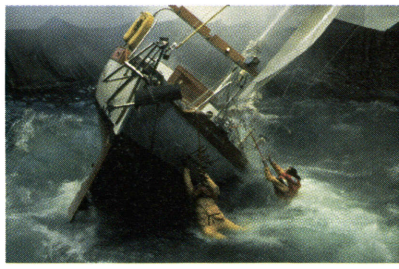
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The evil but alluring mutant Mystique (Rebecca Romijn-Stamos) is up to no good in *X-Men*, directed by Bryan Singer and photographed by Newton Thomas Sigel, ASC (photo by Attila Dory, courtesy of 20th Century Fox).

Contributing Writers:
Stephanie Argy
Bob Fisher
Jay Holben
Kathy McDonald
Graham Rae
David Wiener
David E. Williams



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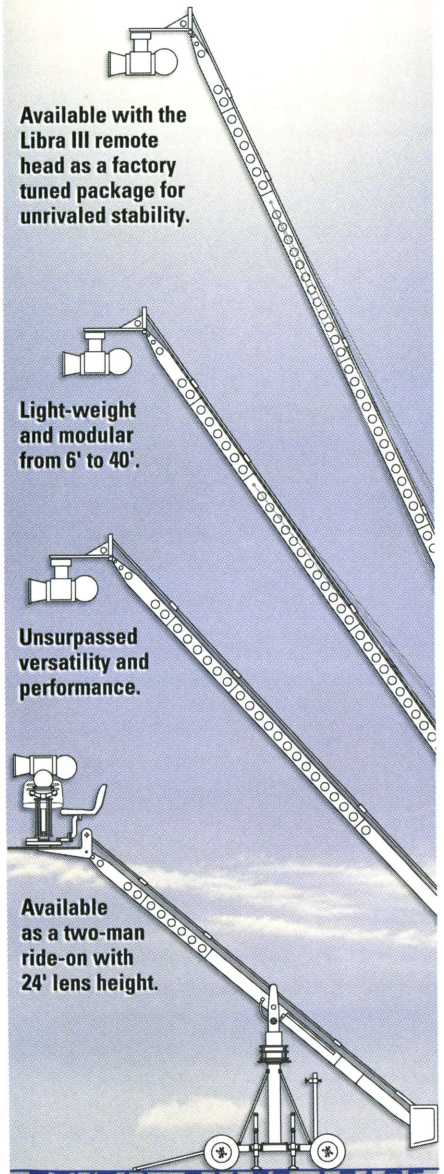


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THE PROFESSIONAL'S CHOICE

"*American Cinematographer* has been a mainstay in my life. One of the biggest honors I've ever received was when the magazine put one of my early films on the cover back in the Seventies. Everybody has their own measurement of success; for me, it was getting the cover of *AC*."

—**Steven Spielberg**

"*American Cinematographer* is a beacon that has illuminated the field of cinematography and the motion picture industry for years, and I've been reading it since I was a film student. *AC* is the definitive publication for cinematographers, and is therefore very important within the industry. It's where you go for unbiased, honest, objective information about filmmaking — where you go for the real story."

—**Martin Scorsese**

"Stanley consumed a lot of books and journals, including *American Cinematographer,* which he read religiously — he was always waving the magazine under my nose to see if I'd read this or that article."

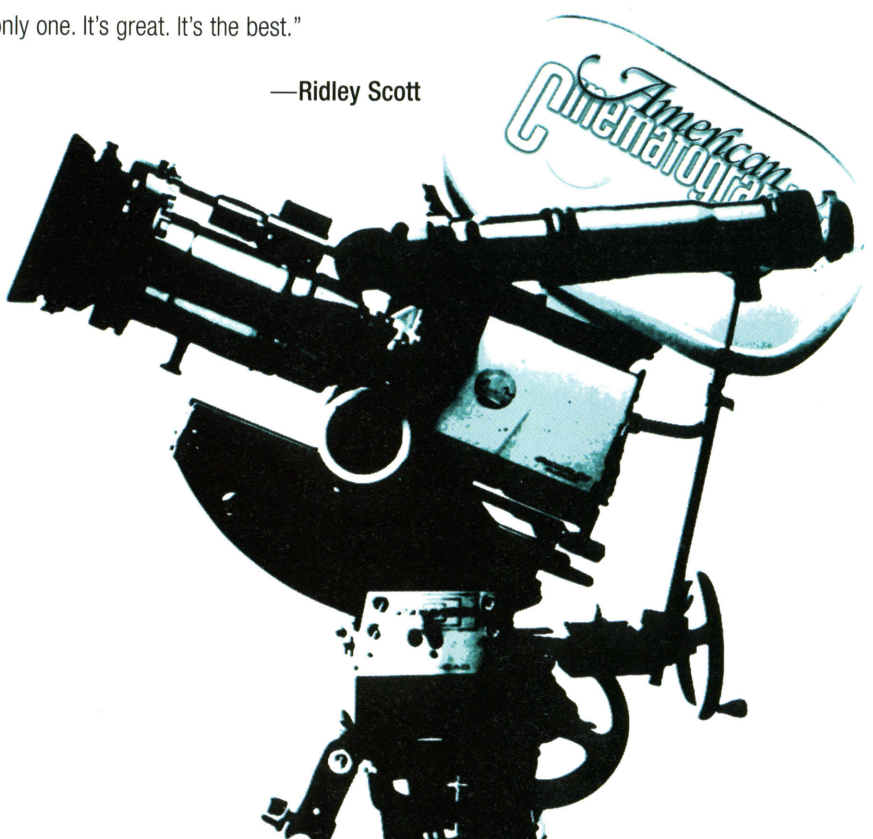
—**Larry Smith**, director of photography on Stanley Kubrick's final film, *Eyes Wide Shut*

"*American Cinematographer* is a great magazine that I've always enjoyed reading. It's good for people who know about the technical side of filmmaking, but it's also good for people who want to learn more about it."

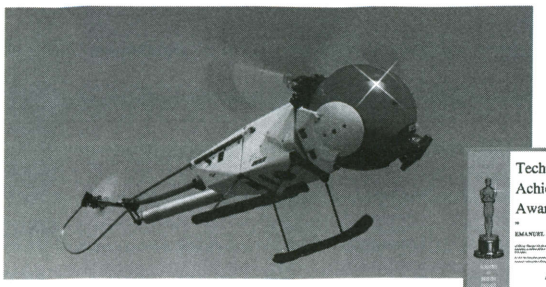
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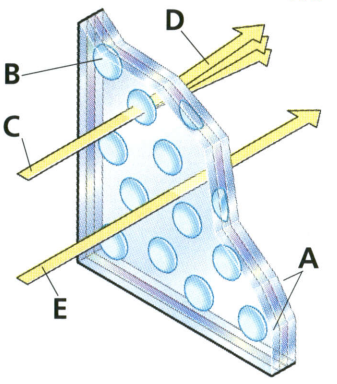
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Clairmont's Unique Squishy Lens™...

Special effects are an increasingly important part of many theatrical releases, television programs and commercials. Audiences have even come to expect them.

Accordingly, growing numbers of post production houses are being called upon to transform ideas into "reality" through costly digital technology. Spending from $10,000 to $50,000 for a single scene is not uncommon.

Needless to say, many DPs, Directors and Producers have openly wished there were more things that could be done through the lens —and not in post.

We've listened...and done something about it! Clairmont Camera's Special Projects R&D team has created the unique new Squishy Lens™ to provide cinematographers with an arsenal of interesting effects that can be created on film. Instantly.

Technically speaking, Clairmont's exclusive (patent pending) Squishy Lens™ is a device that attaches in front of a taking lens (using a focal length anywhere from 14mm to 65mm — depending on the effect you're trying to achieve). It features a crystal-clear, flexible, aspheric optic, whose shape is infinitely variable. The process of making the optic element is in itself quite complex, with the proprietary material formed in a "Class 100" clean environment, using advanced laser metrology. Subsequently, the optic is "sandwiched" between two plates of optical quality polycarbonite that shape it relative to the camera operator's adjustment of triangularly positioned servo motors.

Changing the optical characteristics of the Squishy Lens™ in real time is as simple as using a "joystick" similar to a video game. And you'll have total "What You See Is What You Get" control. As an added benefit, there is no discernable light loss through the Squishy Lens™.

There are a variety of interesting effects possible with the Squishy Lens™. One is to provide a volumetric "tunnel vision" effect. When using a wide angle lens opened up to T2.0, you can have a positionable, variable clear center area, with perimeter areas of saturated colors "smearing" with other colors —as well as the ability to have an adjustable "center" of sharp focus. The sharply defined edges in the central area will produce double image halos as they extend into the smearing zone, and as you stop down the lens the smearing is diminished and you can see objects being stretched and pulled like "optical taffy." Using longer lenses will diminish the effects, and ultimately produce more of a diffusion, with images taking on a prismatic haze.

However, the old saying that "a picture is worth a thousand words" certainly holds true in this case, so we'll gladly send you a videotape demonstrating some of the many effects possible.

The more time you spend using Clairmont's Squishy Lens™, the more ways you'll find to achieve interesting special effects through the camera. It'll certainly challenge your creativity!





NOTE: *The adjacent frame captures do not do the Squishy Lens true justice. It's important to see how motion and lighting changes affect the final image. You MUST see the sample video to appreciate the range of effects. Call for your demo VHS.*







Putting Creativity Where It Belongs!

It's also important to note that when comparing the effects possible with a Squishy Lens™ to what can be achieved on a CGI digital setup, depth and perspective are critical. Because film is essentially a two-dimensional carrier of information, creating complex aspect-related effects digitally can be quite time consuming and costly. Especially when you factor in the common problem of varying interpretations. With the Squishy Lens™ you can see it before you shoot it! Obviously, the ability to do unique effects in camera during actual filming can save huge amounts of time and money.



In the final analysis the Clairmont Squishy Lens™ will make DPs, Directors and Producers happy. A true "win win" situation for everyone involved. What more could you want?

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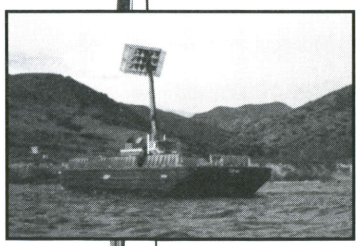


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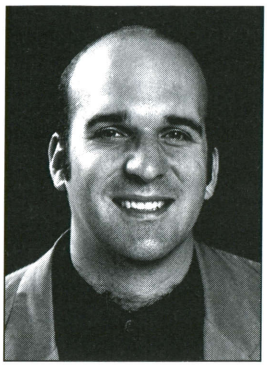
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Editor's Note



For fans of Marvel Comics' *X-Men,* this month has been a long time coming. Over the years, the popular comic's allegorical saga, which pits super-powered mutants against their own evil brethren, has gained a rabid cult of followers who hang on their heroes' every word and deed. The fervor of *X-Men*'s fans was illustrated in a recent press account detailing one acolyte's encounter with actor Hugh Jackman. When the latter revealed that he would play Wolverine onscreen, the starstruck man yanked up a sleeve, revealing a tattoo of the character on his arm.

According to *X-Men*'s cinematographer, Newton Thomas Sigel, ASC, director Bryan Singer kept the true believers' hopes in mind during the shoot, striving for a character-driven narrative. Of course, our accounts of the production also detail the film's eye-popping imagery, in terms of both camerawork ("Unusual Suspects," page 36) and visual effects ("The X-Factor," page 94).

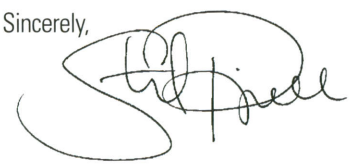
Wolfgang Petersen's seafaring epic *The Perfect Storm* also attempts to keep its characters afloat amid a wild tsunami of practical and digital effects. The film's dramatic onscreen events are based on the true story of the ill-fated *Andrea Gail,* a Gloucester fishing boat that was lost at sea in 1991 amid a tempest of truly titanic proportions. Our coverage includes a Q & A with Petersen ("Salt of the Sea," page 62), a set visit with cinematographer John Seale, ASC, ACS ("Sound and Fury," page 50) and an overview of the film's effects ("Making Waves," page 104).

On a lighter note, Disney's *The Kid* tells the fanciful tale of a middle-aged man who, through a magical turn of events, encounters his own youthful self. The show's cinematographer, Peter Menzies, Jr., ACS, graciously provided *AC* with both an interview and lighting diagrams detailing one of the picture's key sequences ("Unleashing An Inner Child," page 68).

The Disney touch is also apparent in the box-office smash *Dinosaur,* a crowd-pleasing adventure that combines live-action backgrounds with extremely lifelike digital beasts. *AC* effects guru Ron Magid got the inside scoop on this landmark production ("Giant Steps," page 78), which required four years — and untold gigabytes of computer power — to produce.

Since the theme of this issue is visual effects, we've also included an homage to one of the industry's greatest illusionists, the late Albert Whitlock ("Matte Painting's Monet," page 110), whose expert backdrops and miniatures grace an array of memorable motion pictures.

Sincerely,



Stephen Pizzello, Executive Editor
e-mail: stephen@theasc.com

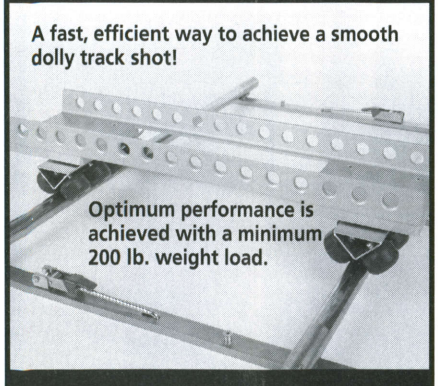
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The Post Process

New Tools Help Blend 2-D and 3-D Images

by Debra Kaufman

The creation of believable computer-generated imagery (CGI) depends on the skill of the artist, the strength of the software and the number-crunching abilities of the computer. But that's only the beginning. If a 3-D CG prop or character is poorly integrated with a 2-D live-action scene, it sticks out like a sore thumb. Indeed, integrating CGI into live action has always been a litmus test, and great attention has always been paid to the innumerable details that "sell" the total image.

However, a recent wave of devices, software and hardware for production and postproduction is turning the 2-D information of a filmed, live-action image or sequence into a veritable treasure-trove of 3-D digital assets, making it easier to place 3-D CGI within the scene. Perhaps most interesting to cinematographers are those tools utilized during production. Panavision's Panascan 3-D scanning technology is based on the Cyrax Technologies 3-D laser scanner, which has been "Panavised" to work more efficiently in the field. According to Frank Dutro, director of operations for Panavision Digital Effects, the company chose the Cyrax scanner for its "high reliability, precision and ruggedness. Even in harsh conditions like the Great Simpson Desert of Australia or a freezing winter in Berlin, the system has never failed."

Dutro says that utilizing LIDAR (light detection and ranging), or laser-based radar, is the best way to capture the 3-D characteristics of sets, locations and large props. He notes that the LIDAR technology is essentially a 3-D camera that "shoots" the scene, scanning 300,000 to 500,000 points — many more than a conventional surveying method and in a fraction of the time — without interrupting the production. Each resulting coordinate contains x-y-z axes and measurement information. The system works in lighting conditions ranging from full daylight to total darkness.

"As long as you're shooting a 2-D plate, why not 'shoot' a 3-D one as well?" says senior scanning supervisor Alan Lasky. "That way, you're totally covered. The 3-D models we produce allow for the addition of unanticipated shots. Long after the sets have been struck, the CG artist can create a new shot by using the 3-D model."

Other uses for creating a 3-D digital model out of the 2-D background plate are shadow-casting and match-moving, according to Dutro. Panascan has already caught on in Hollywood: it was used by Universal to scan the interior of St. Vincent's Church in order to add CG elements for *End of Days,* and for various sets and locations in *The Flintstones: Viva Rock Vegas.* Disney used it to capture several locations for *Dinosaur;* (see page 78), Paramount used it for both the 70mm ride film *The Artist's Journey* (see *AC* June '00) and the feature *Enemy at the Gates;* and Fox employed the technology to scan large set areas for the upcoming *Moulin Rouge.*

At NAB 2000, another company that demonstrated a somewhat similar "2-D to 3-D" solution was 3DV Systems. Founded in Israel, with offices soon to be established in Silicon Valley, 3DV

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Peter James began his career shooting documentaries and commercials. His narrative credits include *Driving Miss Daisy, Black Robe, Rich in Love, Alive, My Life, Diabolique, Last Dance, Paradise Road, The Newton Boys* and *Double Jeopardy. Meet the Parents* is next.

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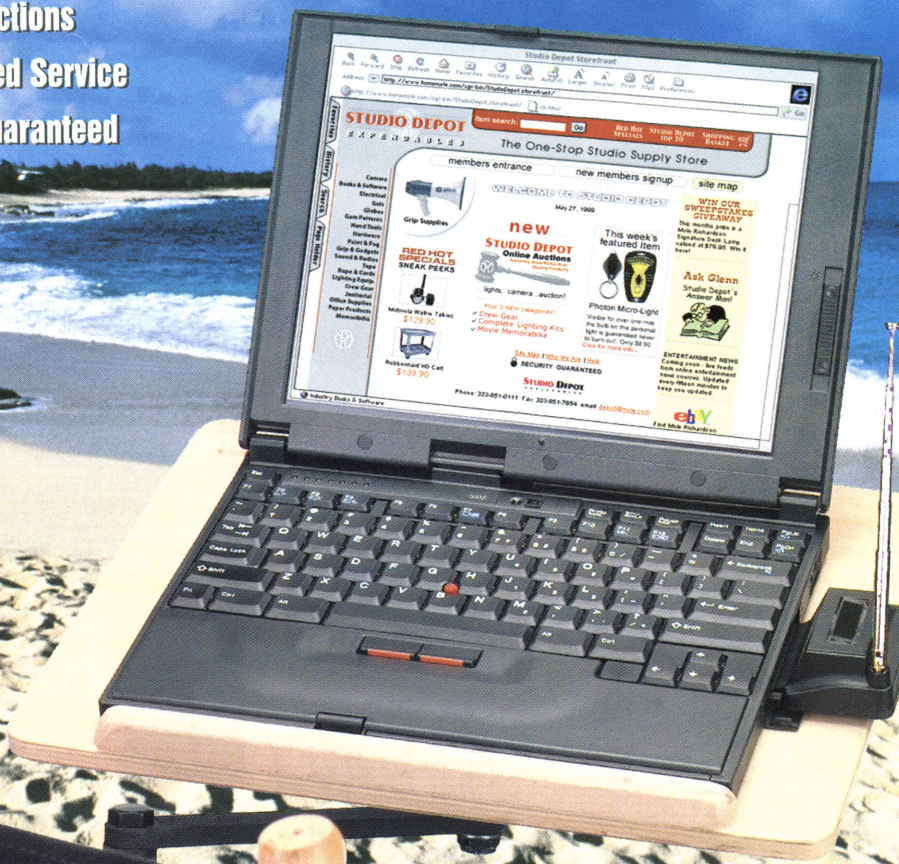
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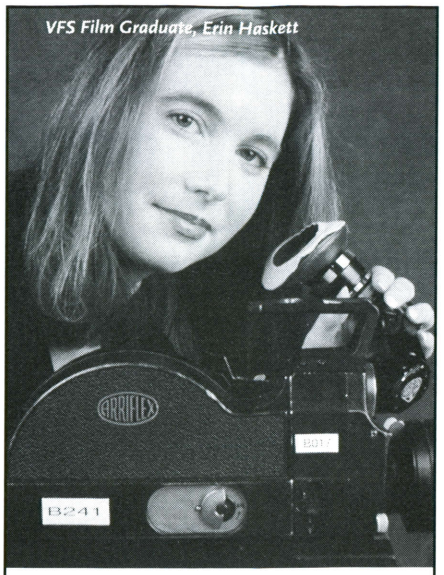
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Systems offers DeepMedia, an end-to-end solution that encodes, compresses and transmits 3-D data over broadband and low-band infrastructures, supporting all video-transmission standards and enabling the viewer at home or in the office to view and manipulate 3-D data. DeepMedia is founded on 3DV's introduction of ZCAM, a real-time 3-D video camera. Based on proprietary Parallel Range Sensing (PRS), ZCAM captures both color (RGB) and depth (Z, the distance from the camera) for each pixel.

With this wave of new tools, it seems clear that 2-D is no longer the barrier it used to be to the integration of 3-D imagery, on set or off.

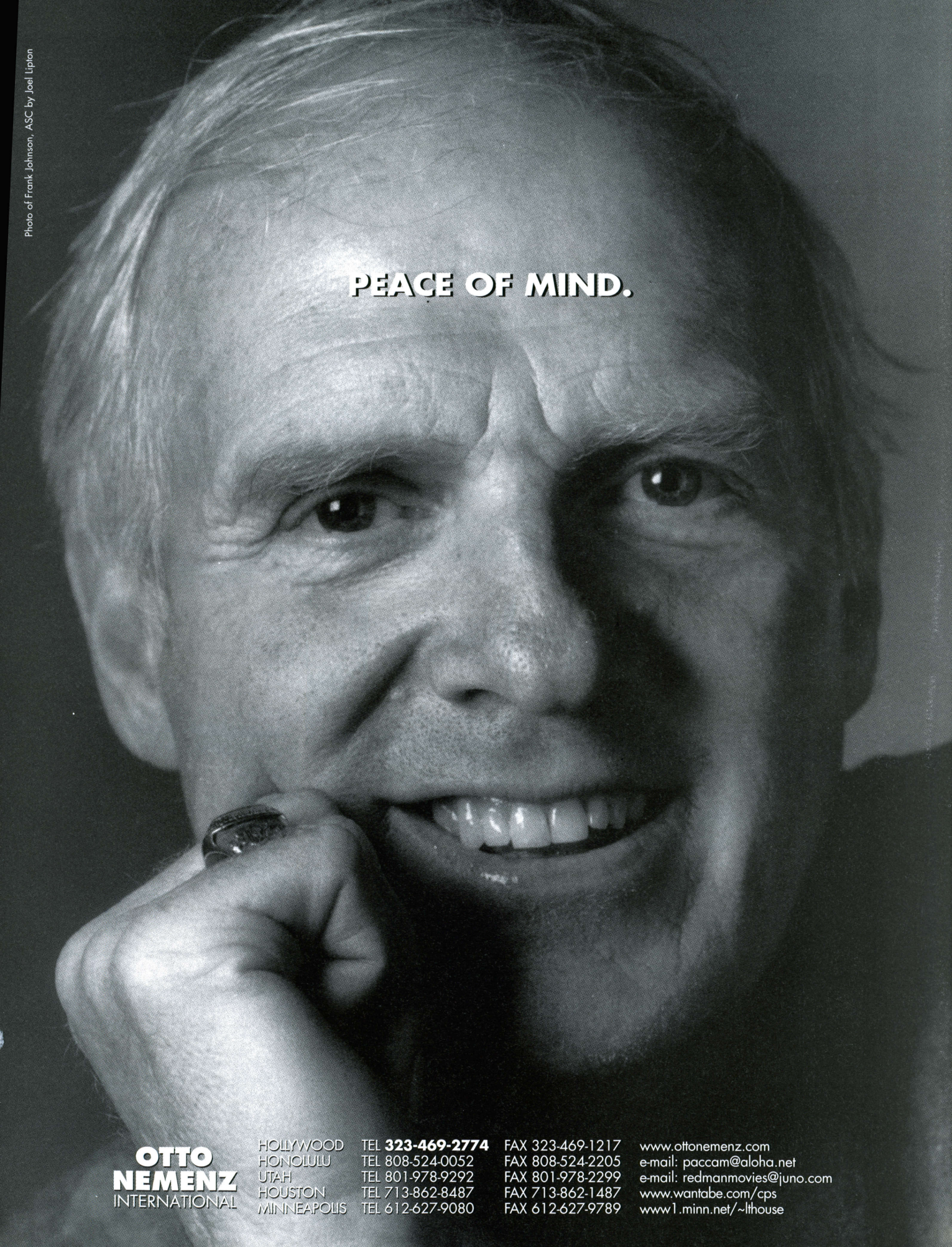
Though DeepMedia is mainly targeted at creating a 3-D home-viewing experience, ZCAM itself has a range of uses, according to Ori J. Braun, president and CEO of 3DV Systems. One of those is to capture the film set as a 3-D model, for either real-time use during a live broadcast or postproduction use, via Alias/Wavefront or Discreet software. Other ZCAM uses include real-time separation of an object from its background using depth keying rather than chroma keying, which makes a green-screen shoot unnecessary. Implementation of a range of 3-D effects can also utilize ZCAM because it captures and maps the third dimension. Users can place objects within a scene in real time or make real and virtual objects interact.

The postproduction use of specialized software to extract 3-D information from a 2-D live-action plate was first brought to the public eye by SynaPix, a Massachusetts-based company founded by Curt Rawley, one of the founders of Avid. When SynaPix first showed the revolutionary concept at NAB '98, it was the buzz of the show. The core SynaPix product is SynaFlex, which has not yet debuted, although several facilities, including 525 Studios, are using it in beta form. At this year's NAB, SynaPix did release SynaMatch, its NT-based 3-D software for match-moving without rotoscoping or matting.

But SynaPix might have been beaten to the punch by another company that showed up at NAB this year, RealViz of France. The company, which comes out of R&D on robotics, is already shipping products and setting up Silicon Valley offices. RealViz offers Image Processing Factory (IPF), a suite of tools that includes both 2-D and 3-D applications. MatchMover provides 3-D camera-tracking and match-moving; ReTimer enables the artist to change the speed of a sequence; Stitcher weaves together a series of still images to create high-resolution panoramas; and ImageModeler is a photomodeling application that outputs photo-real, textured 3-D models from pictures.

IPF is intended to bridge the gap between 2-D and 3-D, allowing easy integration of CG objects into moving, live-action footage. The technology can also enable filmmakers to re-create photo-real environments in CG by stitching together photography from numerous locations. Discreet has already made an agreement to integrate ReTimer and MatchMover into the next version of Inferno, and 3-D developer Softimage will be distributing the software to its users. Alias/Wavefront is also reported to be in discussion with RealViz. Facilities that are already using IPF applications in production include Tippett Studios, Radium, Pepper's Ghost, FrameStore, Will Vinton Studios, Illusion Arts and Mac Guff Ligne.

With this wave of new tools, it seems clear that 2-D is no longer the barrier it used to be to the integration of 3-D imagery, on set or off. That's good news for the creators of visual effects.■


Photo of Frank Johnson, ASC by Joel Lipton
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DVD Playback

by Chris Pizzello

The Birds
Collector's Edition
Universal, $29.98
1.85:1 (16 x 9 Enhanced),
Dolby 2.0 Mono

The Birds remains the most mysterious and perplexing of Alfred Hitchcock's 53 features. Is it a cautionary tale about brittle human relations? A richly metaphoric story of man versus nature? Or is it simply a classic Hitchcock thriller, injecting menace into things we complacently accept as ordinary and everyday?

Hitch himself undoubtedly welcomed all of the above interpretations, for *The Birds* saw the Master of Suspense going to devious and experimental lengths to create a truly multilayered work. Hitchcock stole away the audience's customary emotional cues by unfurling the tale entirely without a musical score, instead substituting some extremely harsh and unnerving electronic "bird effects." He and screenwriter Evan Hunter precisely timed the bird attacks between lengthy dialogue scenes, making it almost mandatory to go back for repeated viewings to scratch away at the film's subtext. The rotund auteur also chose to close the film without credits or even a pithy "The End," implying to an already frazzled audience that our feathered friends had not yet unleashed their ultimate vengeance upon humanity.

As with its previous Hitchcock DVD entries *Vertigo* and *Psycho,* Universal has really gone the extra mile to give *The Birds* (photographed by Hitchcock's longtime cinematographer, Robert Burks, ASC) the deluxe home-video treatment it deserves. The superb new transfer boasts great sharpness, eye-popping color saturation and almost no grain. Some viewers might be thrown by several seemingly soft shots of Tippi Hedren, but the effect is due to the soft-focus treatment Hitchcock liked to lavish on his leading ladies, rather than any problem with the transfer. The Dolby 2.0 Mono sound, though perfectly adequate, is a bit less impressive than the video. One can only wonder how terrifying the bird attacks would be in the more enveloping Dolby Digital 5.1.

Leading off the extras is Laurent Bouzereau's comprehensive documentary "All About *The Birds*," which covers everything from the ingenious old-school effects throughout the film (Hitchcock reportedly used 371 trick shots in the finished film) to the true hell Hedren went through in the bird-attack scenes. It seems churlish to complain about a nearly 90-minute documentary, but perhaps more time could have been spent on the intriguing theories surrounding the film (Fellini called the film one of cinema's greatest achievements, while feminist scholar Camille Paglia devoted an entire book to a psychosexual interpretation of it) and a tad less on all of the admittedly fascinating special-effects trickery. Although the slipcase implies that the disk contains a deleted scene and an "original ending," this is a lot of hooey. The "deleted scene" comprises a series of production stills and script pages, while the alternate ending, never shot, consists merely of storyboard drawings and script. J'accuse, Universal! Also included is Hedren's amusing original screen test with a wisecracking Martin Balsam (who had just worked with Hitchcock on *Psycho*), archival newsreels, production photos and another of Hitchcock's peerless trailers.

The Limey
Artisan, $29.98
1.85:1 (16 x 9 Enhanced),
Dolby Digital 5.1
and Dolby Surround

Taking his stylistic cues from the existential revenge thrillers *Point Blank* (1968) and *Get Carter* (1971), director Steven Soderbergh is really onto something interesting with his cubist thriller *The Limey.* What started out in preproduction as a straightforward character piece eventually morphed into a complex extension of the non-linear, time-leaping structure Soderbergh experimented with in *The Underneath* and *Out of Sight.* Employing enigmatic flashbacks (and flash*forwards*), dialogue snippets that play out even when a character doesn't seem to be talking, and repetitive, hypnotic musical cues, Soderbergh arrives at a profoundly cinematic method of mapping out the interior life of Cockney ex-convict Wilson (Terence Stamp) as he relentlessly pursues a corrupt Los Angeles record-industry mogul (Peter Fonda) whom Wilson believes has killed his daughter.

Soderbergh's longtime cinematographer, Ed Lachman, ASC, tapped right into the adventurous spirit of *The Limey,* and his work ricochets between the stylized (e.g., the evocative, cyan-tinted flashbacks to Wilson's recollections of a beach outing with his daughter) and the gritty (eschewing artificial lights altogether during a scene set in a downtown warehouse, allowing the sickly green hue of existing fluorescents take over). The DVD transfer is flawless, featuring sharp detail, robust color and excellent shadow detail. Audiophiles are also given a choice between listening to the film in Dolby Surround Sound

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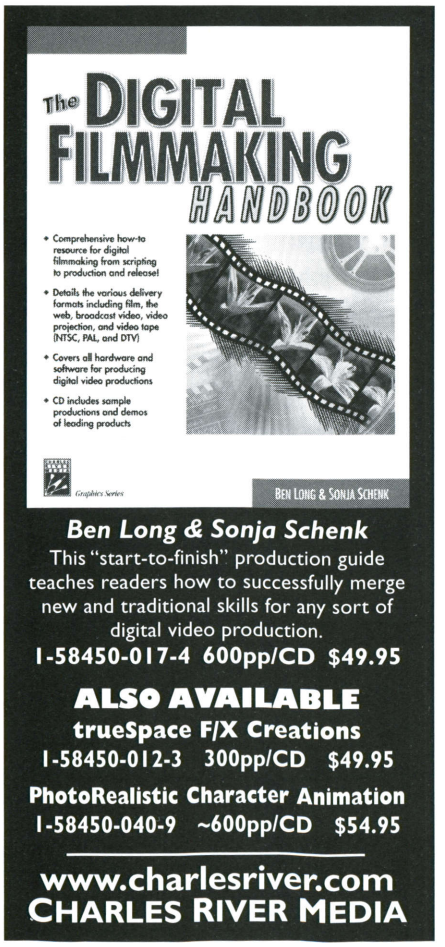
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or the more three-dimensional Dolby Digital 5.1.

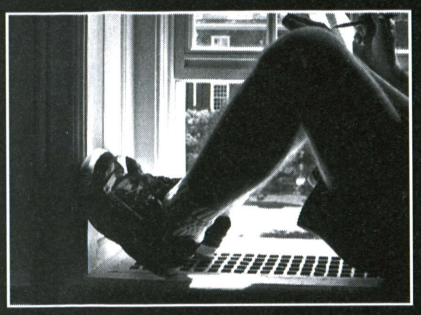
The first of the two commentaries provided is a surprisingly contentious joint session between screenwriter Lem Dobbs and Soderbergh. Dobbs maintains that a few of the critics' "style-over-substance" jabs (perhaps somewhat warranted) resulted from Soderbergh's decision to sacrifice some scenes of character shading in the interest of directorial style. Whomever you side with, it's fascinating to be privy to some of the classic writer-director tension that film buffs are forever reading about. A second "docu-commentary" is more free-form and experimental, containing interesting ruminations on the film's '60s subtext from the filmmakers and cast members who were *there,* man. A third audio track removes all dialogue, letting the aptly chosen '60s songs and Cliff Martinez's haunting score guide the viewer along. In addition to filmographies, trailers and production notes, one more feature has to be mentioned: a cleanly written "technical specs" essay by supervising sound editor/re-recording mixer Larry Blake, who explains the work that went into *The Limey*'s DVD transfer. For technical Luddites, this information will prove extremely enlightening.

Three Kings
Warner Home Video, $24.98
1.85:1 (16 x 9 Enhanced),
Dolby Digital 5.1

On his commentary track to *Three Kings*, director David O. Russell remembers feeling slightly deflated upon hearing that heavy hitters Steven Spielberg and Terrence Malick had their respective epics *Saving Private Ryan* and *The Thin Red Line* en route to theaters as he readied his own war film for production. As it turned out, *Three Kings* became the perfect end piece to this trio of superb contemporary war films. Whereas *Saving Private Ryan* was visceral and emotional and *The Thin Red Line* meditative and existential, *Three Kings* takes the bizarre Persian Gulf "media war" of the early '90s and runs with it, highlighting the schizophrenic, surreal and blackly comedic nature of modern combat.

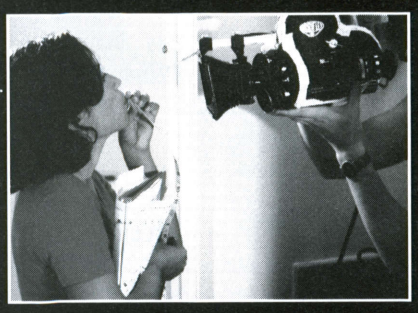
Hats off to Warner Bros. for providing a pristine presentation of this inventive film, as well as a virtual curriculum on the *Three Kings* production. In the studio's canon, this disk is perhaps second only to last year's exhaustive *The Matrix*. In addition to Russell's candid commentary, there is an equally compelling, separate audio track by garrulous producers Charles Roven and Ed McDonnell. The mischievous Spike Jonze, wearing his thespian's hat for *Three Kings*, contributes a satirical poke at actors' pretensions with a brief feature, "An Intimate Look Inside the Acting Process With Ice Cube," as well as a few of his skewed set photos. *AC* readers will be particularly interested in a chat with Newton Thomas Sigel, ASC; the accomplished cinematographer discusses the bleach-bypass developing method employed to visually suggest the soldiers' moral blankness in early scenes, as well as the gutsy decision to cross-process unwieldy Ektachrome still-photo reversal stock for a sizable portion of the film. Also included are several deleted scenes and production designer Catherine Hardwicke's tour through the "virtual Iraq" she created in Mexican and southwestern American locations.

One extra, however, must be mentioned above all others: Russell's hilarious "video journal" of the *Three Kings* project. The supplement begins in early 1998 to the sound of Warner Bros. honcho Lorenzo di Bonaventura speaking encouragingly about the script on Russell's speakerphone in his New York apartment. From there, we are privy to Russell's initial meetings with the actors (including a grumpy Mark Wahlberg, annoyed at the presence of a video camera) and the infuriating grind of budget meetings, rehearsals and preproduction. The journal then cleverly jump-cuts from the first day of filming to an explosion of flashbulbs at the film's Los Angeles premiere. This entertaining, 13-minute short manages to capture all of the agony, ecstasy and pure tedium inherent in modern moviemaking. ■











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Production Slate

compiled by Douglas Bankston

Sweeping vistas add to the emotional impact of *Amargosa*, which details Marta Becket's passionate pursuit of dance in the desert.





Amargosa unit photography by Sidney Sherman (p. 22) and Traci Robinson (p. 24) *Chuck & Buck* unit photography by Alexia Pilat

Desert Bloom

by Bob Fisher

The documentary *Amargosa* chronicles the spirit of Marta Becket, a successful ballerina and painter who created an oasis in a desolate ghost town. In 1967, when their trailer broke down near Death Valley Junction, California, Becket and her husband found the remains of an adobe hotel and a few rotting buildings, including a theater, some 25 miles from the nearest town. The couple spent six years restoring the theater and 14-room hotel, and Marta painted the walls and ceiling of the theater with a life-size mural of a Renaissance audience. After she discovered that the town had been called Amargosa before 1907, she gave that name to the opera house. At first, Becket danced in pursuit of her muse and was discovered accidentally by a few isolated travelers, but word soon spread about her mime and dance performances, and more and more people began making pilgrimages to Amargosa to see her.

Call it serendipity. In November of 1998, producer Sidney Sherman, cinematographer Curt Apduhan and director/writer Todd Robinson were desolate when a cherished project melted down after almost a year's hard work. "We were very discouraged," Robinson recalls, "when my sister [and executive producer] Traci called and told me about meeting Marta. Within 10 minutes, I decided that Marta's story was my story — and the story of all my friends who are artists, painters, dancers and writers. It had a transcendent, metaphoric quality that went way beyond her interesting biography."

Robinson, a former actor who segued into writing (*White Squall, The Four Diamonds*) and directing, says creating a feature like *Amargosa* isn't a venture for the faint of heart — even though the film's central subject was more than willing to participate. "It was easy to convince Marta," he says. "She was 76 and concerned about her mortality and what her her legacy would be once she was gone. It was like she was waiting for someone to come along so she could tell her story."

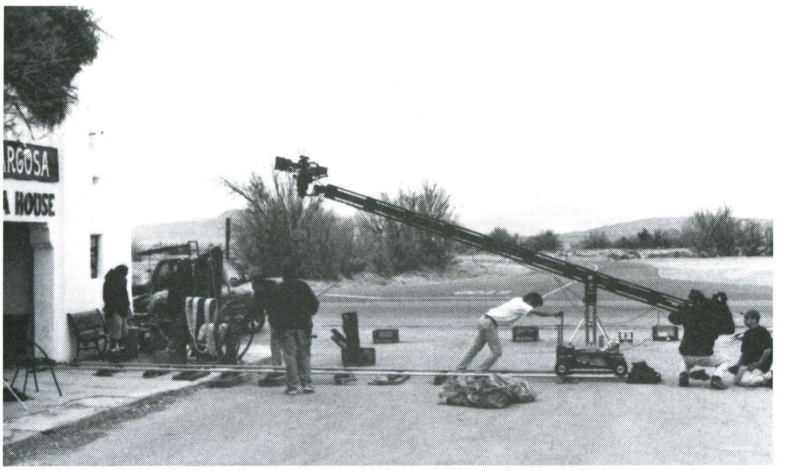
Robinson first worked with Sherman on the Disney Channel docu-

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Top: Becket performs one of her dance pieces inside the Amargosa Opera House. Center: Outside the Opera House, the crew sets up a Lenny arm for an intricate dolly shot. Bottom: Director Todd Robinson (kneeling) prepares to shoot an interview as director of photography Curt Apduhan frames the shot.

mentary *The Legend of Billy the Kid*, which earned an Emmy in 1994; he also worked with Kenneth A. Carlson on the award-winning *Wild Bill, Hollywood Maverick*. The three formed Triple Play Pictures, and Apduhan shot one of their first projects, a documentary series called *Stand and Be Counted*, which will air on The Learning Channel later this year.

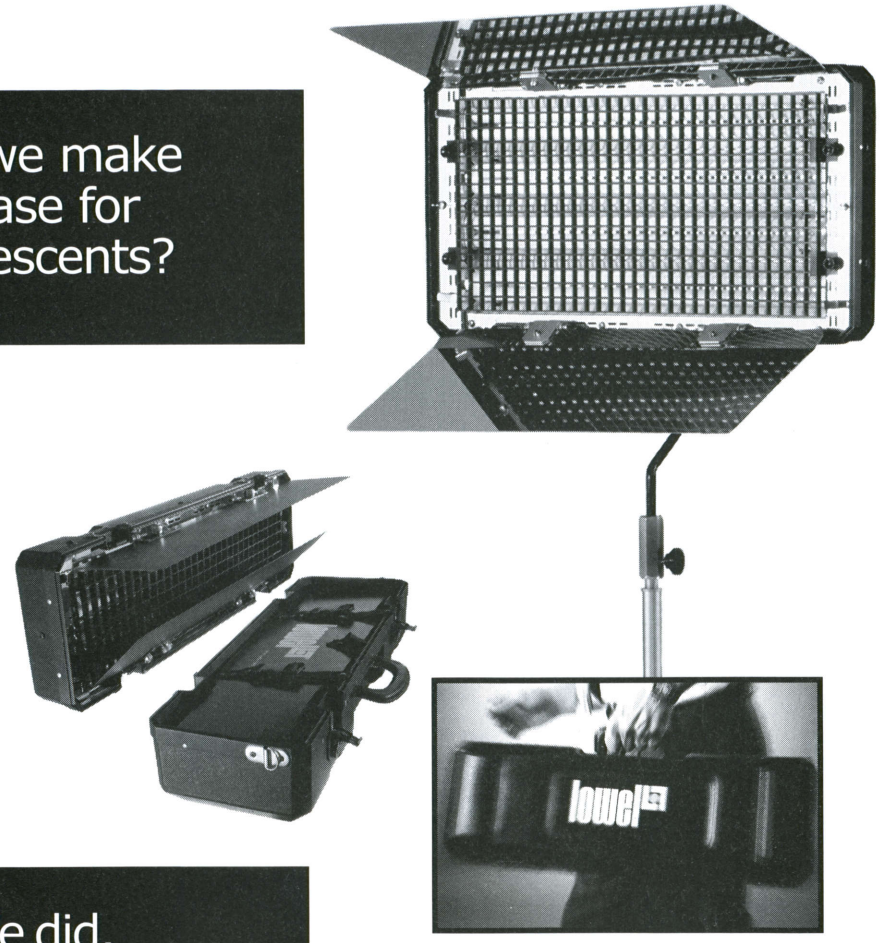
When they began planning *Amargosa*, Apduhan and Robinson chose to film it in Super 16; they felt the story required a wide-screen, cinematic feel and decided they could live with the image quality of a 35mm optical blow-up. Apduhan used two Arriflex 16 SR3 cameras and Robinson's wind-up Bolex camera, and the latter "gave us some of our most magical film," says Robinson. The package provided by Keslow Camera included three Canon zooms, an 11.5-138mm for the A camera, a 150-600mm zoom for longer shots, and an 8-64mm that was primarily used on a Steadicam. A 6mm Century prime lens was used in tight spots.

During preproduction, Robinson learned that there was going to be a reunion of dancers with whom Becket had worked during the past 40 years; he felt that the event could provide the emotional spine of the story. The crew stationed a camera on the bus to record people on their way to the reunion, and a second camera on a Steadicam was waiting when the bus pulled up. The camera crew on the bus then hustled into the theater in time to catch the arrival of the audience. A third camera was used during the filming of performances. Apduhan notes that it took a lot of choreography to keep the cameras loaded and avoid gaps in coverage; the crew was shooting on the fly, sometimes at different speeds. "Todd is a visual director," the cinematographer says. "Even his writing is filled with visual parables. He wanted to make sure we told the story in a cinematic way, capturing unrepeatable moments as they happened."

The filmmakers made four more visits to Amargosa, each lasting about five days, and shot about 40 hours of film as they discovered more about the desert and Becket. "One of the shots I love the most is [a helicopter shot] of some wild horses," Robinson says. "The helicopter pulls away and they just disappear into the brush." Usually, the cameras were moving with Becket and the other characters either on a dolly or a Steadicam, but there were no unbendable rules. Sometimes, the crew would put the Bolex on sandbags and wait for the right light.

Robinson filmed several conversations with Becket that reveal the arc of her life, peeling away layer at a time, and he peppers that footage with still images

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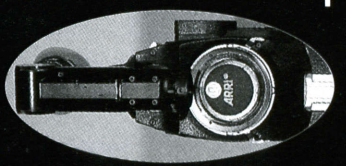
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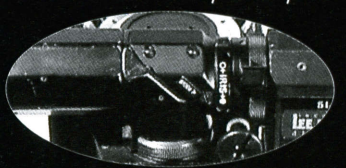
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from her past life. (The stills were converted to film at Pacific Title & Art Studio.) "When we filmed Marta's performances, we realized we weren't just watching her dance," he says. "Being in that theater was like being inside her head. We wanted to create that experience for the audience so they could discover Marta and the desert for themselves, like we did."

Apduhan shot most of *Amargosa* on three Kodak Vision stocks, noting that he was especially concerned about grain. "I knew we were going to make a blow-up for projection, and I picked films that had the right texture for the emotions of each scene," he remarks. "I let the grain help tell our story. We also used [Kodak EXR] 7245 [daylight-balanced] film for the Bolex exteriors."

"Sometimes I had to pull away from the eyepiece because I had tears in my eyes. We hope the film will affect the audience in the same way."
— cinematographer Curt Apduhan

The cinematographer noticed during his first meeting with Becket that her eyes were youthful and alive, even though the body around them had aged. "I decided to wrap light around her, keeping the source very soft and very close during interviews," he says. "I let her shadow side go. We didn't use any filtration because I didn't want to introduce any noise. In one sequence, when she is in front of her makeup mirror getting ready for her performance, her key came from a little, fluorescent-green makeup light reflected in the mirror." (The light was later color-corrected to normal.)

Apduhan tried to keep the interview subjects to the left or right of the frame, leading the audience's eyes into the void. "Todd is a big fan of negative space and allowing the frame to breathe," he observes. "That was important, because the environment plays such a major part in the story. In interviews with Marta, we want members of the audience to feel as though she's having a conversation with each of them."

Robinson affirms, "I like to go deep into negative space. We used light to create a sense of depth, separating the foreground and background. Sometimes Marta became aware of the camera and lights and we lost that intimacy, so we'd make some adjustments by moving back with the longer lens; we'd try to remove the distractions. She's told her story so many times to so many people that sometimes it sounded rote, so in order to make it feel spontaneous we'd have to [guide her to] places she might not normally go."

Becket's performances in the theater were always very formal, and Apduhan chose the 200-speed 7274 stock for those shots because it renders more contrasty images. For exteriors, he used the 320-speed 7277, which he describes as being pastel with a bit more muted cast. He explains, "Sometimes I had to pull away from the eyepiece because I had tears in my eyes. We hope the film will affect the audience in the same way."

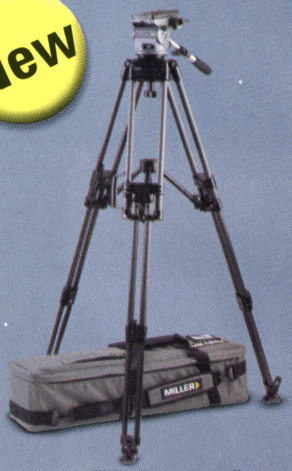
Live performances were filmed with two cameras, with an additional camera recording the audience's reactions. Apduhan used a Chapman crane with a Lenny arm for some sweeping shots that puts the viewers right on the stage. "Todd had great ideas that usually came to him at 2 a.m.," says Apduhan. "One day he had an idea for a Steadicam shot that began in the lobby of the hotel and ran for about 400 feet. The character walked through the hotel lobby, outside to the street, then into the empty theater and down an aisle to open the theater doors and let in the audience. I had to let the practical lights [in the hotel], which were energy-efficient fluorescents, go green. We stepped outside into the darkness. The only sources of light were

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some fluorescent practicals, where we were shooting between zero and five footcandles with the highlights reading 15. He walked right into the theater, which had tungsten sources. I decided to use the [Kodak] Vision 500T [7279] film and push it one stop, knowing that grain wasn't a problem because it followed our artistic intent."

Shooting scenes and performances in the theater presented some challenges. "I thought about hanging space lights," Apduhan says, "but that wouldn't work because we needed shots of the ceiling. The paints that Marta used on the walls were very reflective, so it acted like a mirror. We came up with the idea of using small tungsten sources along the walls, casting the light straight up so it reflected off the ceiling. It was a very theatrical look. We used Tweenies, 2Ks and 5Ks and tried to make them balance so the light would seem realistically even."

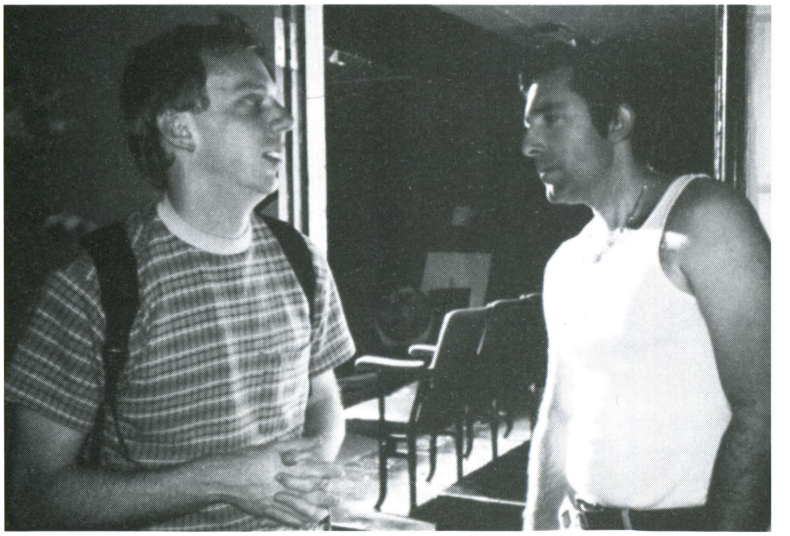
Apduhan used the 500-speed film pushed one stop for the performances. He overexposed a bit to get a little edge in exposure, keying at T4 with the lens set at T2.8. "The theater is Marta's space, so we made the lighting as formal and theatrical as possible," he notes. "It was kind of a 1940-ish style with vignetting. In formal interviews, we painted the light around her, but when she was in her world, we let the light play."

The filmmakers initially planned to convert the film to video for offline editing and conform the Super 16 negative to the edit-decision list. The edited negative would be used to make an optical blow-up for 35mm release printing. "Nancy Schreiber [ASC] told us about a digital intermediate process at Cinesite [in Los Angeles]," says Robinson. "We found that we could use a laser recorder to convert a digital master to 35mm color intermediate film. It was still experimental, and no one had done it with a D1 master made from a Super 16 original, but it gave us a lot of flexibility. We were able to do secondary color-correction on parts of frames. That's standard for television, but not when you're planning on making film prints."

One example of how Robinson used the medium to interpret reality is a scene in which Becket talks about her past; in post, Robinson desaturated all of the colors to make a visual transition to an earlier time, when images were black-and-white. The film tumbles back into the present by reverting to the original colors. FotoKem did the front-end lab work, and the colorist was P.J. Marsiglia at Company 3, which did the telecine transfers. They made a color-corrected master in digital Betacam format, and IVC digitally removed dirt; vertical scratches were removed using the Inferno at Encore Hollywood, and Cinesite recorded the D1 master onto film.

"Making a film like this is like running a 600-meter race," says Robinson. "You can't stop at 580 meters because you're out of time or money. You have to surround yourself with other people who feel the same aesthetic commitment."

Amargosa premiered at the Slamdance 2000 Film Festival and was one of 12 finalists in the documentary category at this year's Academy Awards.



In *Chuck & Buck*, a digital-video feature directed by Miguel Arteta, Buck (Mike White, left) tags along behind his childhood friend Chuck (Chris Weitz), who's on the fast track in the L.A. music industry.

A New Kind of Buddy Movie

by Kathy McDonald

The eponymous characters in *Chuck & Buck* are a study in opposites. Buck, a childlike man who has never grown up, reconnects with Chuck, his boyhood best friend, at his mother's funeral. Buck follows Chuck to Los Angeles, where Chuck is on the music-industry fast track, and tries to recapture his friendship. While this premise sounds innocent, the film takes a satirical, fairly dark look at childhood fun and games.

The film was a reunion for Los Angeles-based director Miguel Arteta and cinematographer Chuy Chavez of Mexico City. Their first feature together, *Star Maps* (a 1997 Sundance selection), was an ensemble piece set in Hollywood's seedy underbelly. According to Arteta, he saw Chavez's first feature, *El Bulto* (*The Lump*), at an L.A. film festival and tracked him down to offer him *Star Maps*. Chavez agreed to do the project, even though Arteta promised very minimal accommodations and a crew of two who spoke only English. "Chuy embodies the true indie spirit," Arteta says. "He came to L.A. to shoot *Star Maps* and slept on my sofa two weeks after winning an Ariel [Mexico's equivalent to the Academy Award]. When I saw *El Bulto,* it reminded me of Tak Fujimoto and Jonathan Demme. Here was a cameraman who knew how to love an actor's face."

Like *Star Maps, Chuck & Buck* was independently produced for less than $1 million, but whereas *Star Maps* was shot on 35mm, the filmmakers opted to shoot *Chuck & Buck* using Sony's consumer model digital-video

Actor James Cromwell

Cromwell Eyes SoftSun

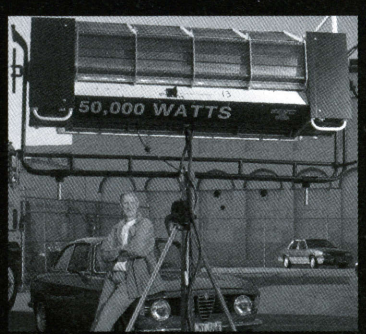
SoftSun lighting units are earning rave reviews on more and more sets — and not just from behind the camera.

Take actor James Cromwell. Whether playing a kindly farmer in *Babe* or a chillingly corrupt police captain in *LA Confidential*, Cromwell never fails to transform himself before the camera. But when working on the set, he says, the lights can sometimes be problematic.

"There are times when you have to look straight into an arc, he explains. I noticed that the SoftSun lights are much easier to look into than conventional lights of the same output. From a distance you can look almost directly into even the 50K SoftSun without discomfort.

When I asked the SoftSun designers about this, they explained the source of the light (the arc plasma) was many, many times larger than conventional, round light sources like HMI and tungsten. It's that difference that minimizes the squint factor with SoftSun.

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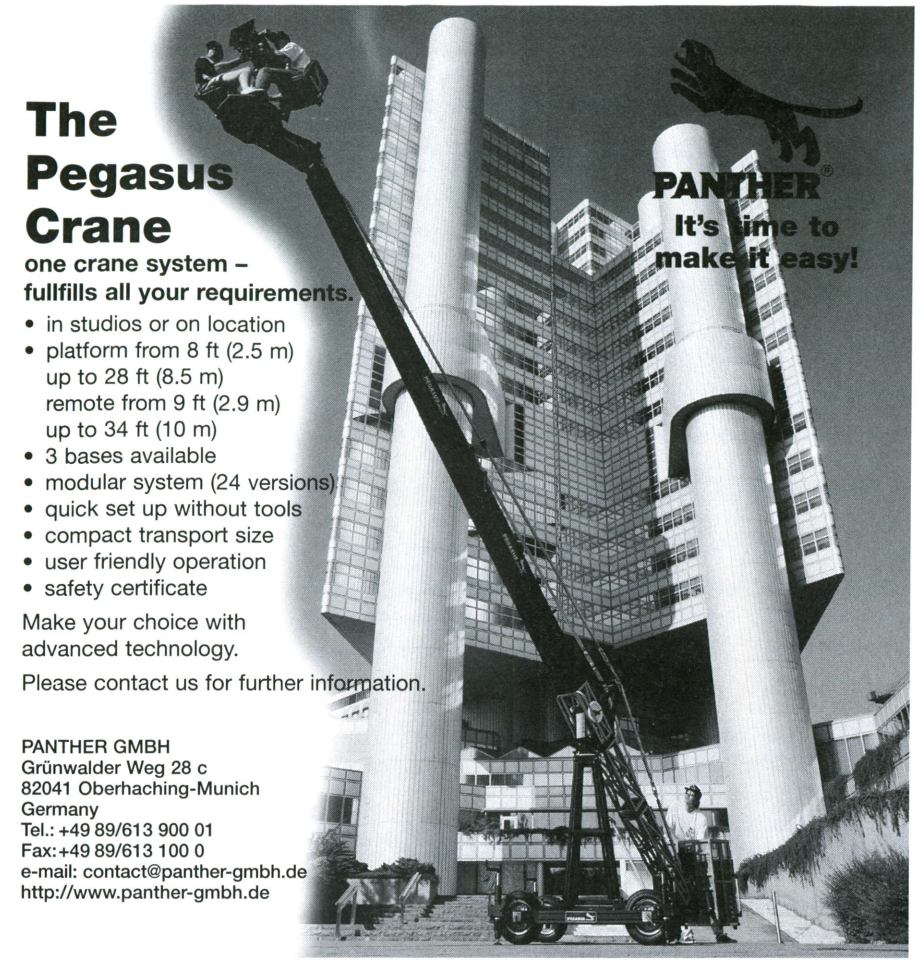


Especially in car scenes, when the lights are down low and full-on, it's tough not to squint. SoftSun on the hood of a car rig makes it much easier to maintain a natural expression. And since it dims so easily — without changing color characteristics — the gaffer can quickly adjust the brightness of the light to make it even more actor friendly."

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(DV) cameras and mini-DV cassettes. "The audience does not know if you are shooting on film or video — they're looking for story and performance," Chavez maintains.

Because of the lower cost of digital production, Arteta was able to spend more time working with the actors and shooting, eventually ending up with more than 90 hours of footage from a 24-day production. "It was a good thing to shoot on DV, [because] we could never have shot a half-million feet of film," says Chavez. "When you're shooting on a low budget, you don't always have the [money] to keep going if you don't get the best performance right away. Miguel wanted to do more, to have more quality, [and] sometimes it took 10 takes."

Chuck & Buck stars and was written by Mike White, whose writing credits include TV's *Dawson's Creek* and *Freaks and Geeks*. White portrays Buck, the film's emotional center. The other principal cast members are also non-actors: brothers Chris and Paul Weitz (co-directors of *American Pie*) and Beth Colt. Arteta says he felt that by shooting in DV, he could create better performances, and intimate sets that would be less intimidating to the neophyte actors.

Using DV cameras to achieve a film-like look involved several preproduction camera tests. The Zurich-based digital-effects house Swiss Effects was chosen by Arteta and Matthew Greenfield, the film's producer, for the transfer from high-resolution DV to 35mm film. Swiss Effects advised the filmmakers on the optimum camera specs, ultimately recommending two PAL Sony VX-1000 cameras to ensure a clean transfer with few digital artifacts. PAL records at 25 frames per second, guaranteeing a 1:1 video-to-film transfer with no frames lost. At a Q&A following a screening of *Chuck & Buck* at this year's Sundance Film Festival, Arteta noted that "video-to-film has a glossy, silky quality and an element of intimacy that is important for character-driven stories."

Because *Chuck & Buck* was Chavez's first digitally shot feature, he

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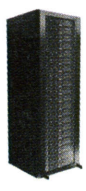
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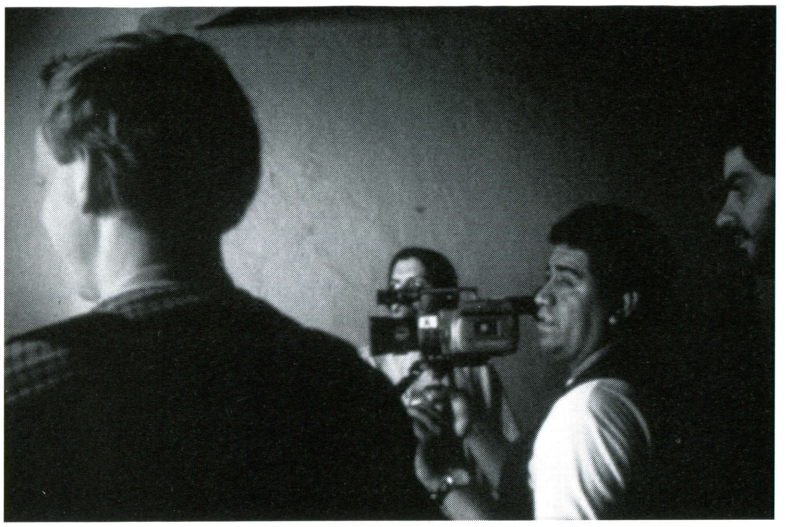
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Cinematographer Chuy Chavez positions a Sony VX-1000 DV camera under the watchful eye of director Miguel Arteta.

tested a number of cameras, formats, filters and lighting setups to arrive at the film's final look. His most pressing concerns were to light in order to minimize DV's higher contrast and to compensate for the camera's reduced depth of field. "I didn't try to duplicate cinema, and I used contrast to get more dramatic scenes," says Chavez. "Although shooting in video is easier in some ways, lighting is *not* easier; you certainly can't put an actor in front of a window. In interior shots, I could play with the lights and have control, [but] exterior shots were more difficult. I used sunlight and had no control of the light."

Most scenes in the film were lit with a 12K HMI and one 200-watt key light. Layers of ND gels covered the windows for interior scenes. Because the camera was not a professional model, there were no exposure settings. Chavez left the lens wide open and used his light meter to match lighting and contrast levels. He further manipulated the image by combining at least three filters on every shot: a polarizer, an 81C to warm up the image, and a ½ Black ProMist to soften the resolution. "I used diffusion to erase video's crispness. The main differences between video and film are color, depth of field and focus."

Several flashback scenes highlight Chuck and Buck's childhood friendship. In order to achieve the very light, blue images for those dreamy scenes, Chavez employed a #3 ProMist filter, balanced the camera for tungsten light

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and overexposed the video. He followed the child actors with a Steadicam. "We used [the Steadicam] throughout the shoot," he says. "In only a couple of instances did we have time for a dolly." The cinematographer adds that the small, lightweight cameras were extremely versatile: "You can move faster, can change setups faster, and see the image right away with video. It was so easy to just put the camera on a sandbag on the floor and shoot."

Chavez shot *Chuck & Buck* as if it were 35mm film, using classical compositions and avoiding handheld setups. "We moved the camera a lot and put it right in front of the actors," he explains. "Every move of the camera is so important, because it moves the eye of the audience. I hate fast panning [because] I never move my head like that. I used lots of close-ups, putting the audience closer to the actor so they can listen."

All scenes were shot with two cameras: one for close-ups, the other for medium close-ups. Chavez operated one camera, and gaffer John Capron handled the other. The production team chose to use no white walls or costumes, but beige and grays instead; colors were tested in Chavez's preproduction video-to-film transfers.

In one key dramatic scene, Buck reveals the depth of his obsession with Chuck in a dark, red-hued bar. This pivotal backdrop went beyond the capabilities of the mini-DV camera, but Chavez solved the problem with some technical know-how. "We used a lot of light in the scene," Chavez notes. "We decided to make it very red and very dark. I used red filters and closed the stop to get more black on the walls, [without making things] too noisy." To get the scene as dark as it is in the final print, the timing was adjusted at the lab.

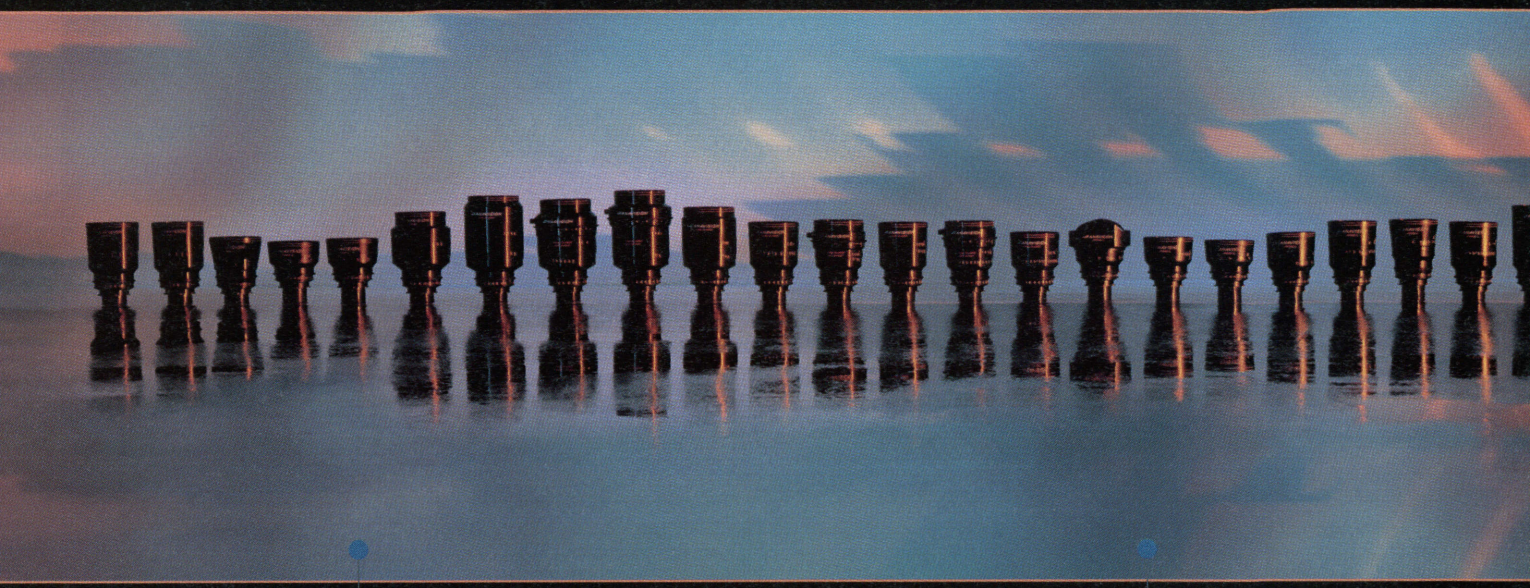
The filmmakers also opted to shoot full-screen video in a ratio of 4:3 rather than 16:9. Tests were done with and without letterboxing. For production, Chavez lined up the frame on a white card and shot to cover 1.85:1, and the editor adjusted his monitor accordingly. The feature stayed in the PAL format for the entire video editorial, from the offline edit, to the digibeta online, to the sound mix at Wilshire Stages.

"If you are a painter, it doesn't matter if you use oils or pastels; the most important thing is to express something," says Chavez. "For me, the transfer works. It looks like film but [has] a different look — not less quality, but very crisp and sharp. It doesn't look like a TV program, either. It has its own character."

By the time *Chuck & Buck* is released this month, Chavez will be shooting another DV feature, an action film called *Chiapas*, in Mexico. "If I wait for a 35mm film budget, it may never happen," he admits. ■



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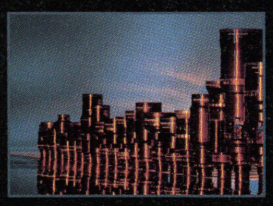
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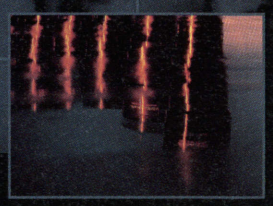
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Unusual Suspects

Cinematographer Newton Thomas Sigel, ASC re-teams with director Bryan Singer for *X-Men*, a tale of superheroes at odds with humanity.

by David E. Williams

Unit photography by Attila Dory

In the sci-fi-themed feature *X-Men*, based on the long-running and wildly popular Marvel Comics title of the same name, humankind is challenged by the sudden appearance of children born

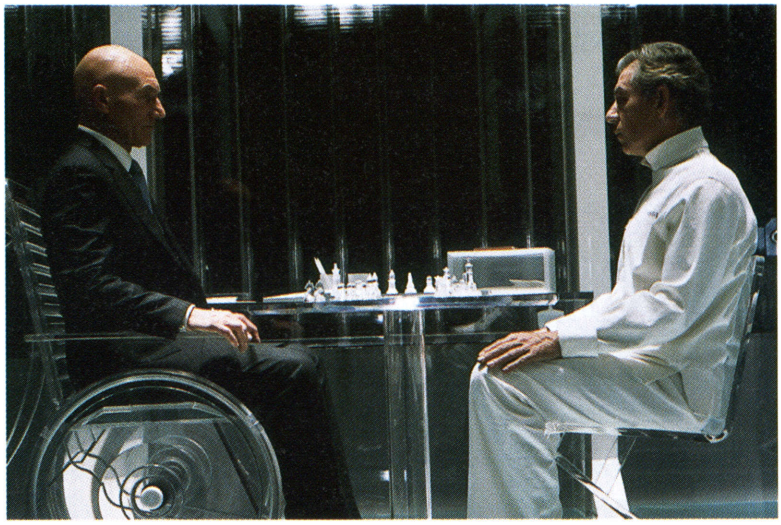
Photos courtesy of 20th Century Fox.

with an added DNA twist — an "X Factor" that endows them with extraordinary powers such as exceptional strength, flight and telekinesis. Categorized as Homo Sapiens Superior, these gifted "mutants" soon become a new minority group that earns the paranoid contempt of all "normals."

The situation compels one of the mutants, the super-psychic Dr. Charles Xavier (Patrick Stewart), to gather these misunderstood souls — including Cyclops (James Marsden), Rogue (Anna Paquin), Jean Gray (Famke Janssen), Storm (Halle Berry) and Wolverine (Hugh Jackman) — in a safe place where he can teach them to use their abilities for the common good. Meanwhile, a powerful mutant named Magneto (Sir Ian McKellen), vowing revenge on all humanity, recruits a villainous team, the Evil Brotherhood, to push aside anyone who gets in his way — including Xavier's group, which is known as the X-Men.

"I think of the story as a parable of the philisophical differences between Martin Luther King and Malcolm X," reasons *X-Men*'s director of photography, Newton Thomas Sigel, ASC. "Xavier and Magneto have opposing ideologies about the same issue: helping their people. Each has a certain degree of credibility, and they are struggling with each other. That's what made the script interesting."

The picture marks the third feature collaboration between Sigel and director Bryan Singer. Their first, the uniquely plotted crime film *The Usual Suspects*, earned the cameraman a 1996 Independent Spirit Award nomination. The duo followed that up with the dramatic thriller *Apt Pupil*. Sigel recently earned kudos for his inventive use of cross-processed reveral stock in the Desert Storm drama *Three Kings* (see New Products & Services, *AC* Nov. '99), and his other features include *Brokedown Palace*, *Fallen*, *Blood and Wine*, *The Trigger Effect* and *Foxfire*.



Seeking to continue their working relationship, Singer approached Sigel with the *X-Men* script, but it would go through a series of its own mutations, deaths and rebirths as budgetary issues arose. "Somewhere along the way, [20th Century Fox] decided they were going to spend $75 million and not a penny more," Sigel reports. "Before we had a final script, the decision was made that the [New York-based] film was going to be shot in Toronto. At one point they told us to stop trying to make Toronto fit our script, and that we should just adapt our script to Toronto," he adds with a wry chuckle. "I had about seven weeks of prep, and it wasn't as efficient as it could have been," Sigel recalls. "You want to spend all your time focusing on the creative aspects but unfortunately a lot of time and energy goes into budgeting and logistics."

The strong genre angle of *X-Men* prompted Sigel to consider how other films of this type have been photographed. "The 'comic-book movie' has become its own genre," he notes, citing the *Batman* films, *Dick Tracy*, *Spawn* and *Superman* as prime examples. "My first concern was coming up with a fresh visual approach, one appropriate for this particular story. I knew Bryan wasn't doing this film because he necessarily wanted to make a comic-book movie. He is very much a character-driven, reality-based director, so I knew he wouldn't want the type of elaborate, stylized look that Vittorio



Opposite page: Wolverine (Hugh Jackman) uses intimidation to make his point. This page, top: Squaring off at a chessboard, Professor X (Patrick Stewart) and Magneto (Ian McKellen) try to anticipate each other's moves. Below: Director Bryan Singer attempts to exert Magneto-like control over the production, under the watchful eye of cinematographer Newton Thomas Sigel, ASC (at camera).

Unusual Suspects



Sigel gets on top of the action as Wolverine dukes it out with a beefy adversary in a "steel-cage match."

Storaro [ASC, AIC] had created for *Dick Tracy*. Besides, Storaro did such an amazing job on that picture, there was no reason to do another one [like it].

"I actually avoided using a lot of color," Sigel continues. "I instead wanted the colors to be balanced and fairly muted and subdued, to go against that primary-color, comic-book look. In fact, I pull-processed most of the film to desaturate everything." This sparing use of key hues subconsciously adds to the film's drama. As Sigel explains, "Certain colors pertained to individual characters, and we'd occasionally put little pieces of those colors into the backgrounds. This was a subliminal evocation of what certain characters represented to me. For example, we sometimes had a particular shade of red that we used in the backgrounds behind Magneto, which helped represent the primacy of his passion. We didn't do it very often, but those colors become more interesting because they stand out against the overall, muted palette."

Sigel says he sees the increasingly flashy visual pyrotechnics on display in contemporary action films as being "very much like a photographic arms race. It's very easy to fall into the trap of thinking, '*The Matrix* got to use their bullet-time effect, so I want to do an even bigger or better bullet-time gimmick.' While I admire what they did in that film, cinematography is not a competition to see how many revolutions you can make on the camera with a hothead. You can still do innovative things without becoming like a theme-park ride.

"The best solution [for *X-Men*] wasn't to go either 'Las Vegas' or old-school classical. Instead, it was to find an organic way to use the camera in relationship to the story. *X-Men* has a fairly classical look — it's more [like] *The Godfather* than *Batman*."

One given was that *X-Men* would be composed in 2.35:1 widescreen. While Sigel and Singer had shot both *The Usual Suspects* and *Apt Pupil* in Super 35, they chose Panavision anamorphic for their latest effort, primarily relying on close-focus Primo lenses. This choice impacted a recurring camera technique that the two filmmakers had heavily relied upon in those previous pictures. "On *The Usual Suspects*, Bryan and I developed a way of shooting dialogue scenes with a combination of slow, creeping zooms and dolly moves that ended in tight close-ups," Sigel says, explaining that this strategy added subtle energy to scenes despite cramped practical locations and short shooting schedules. "Bryan fell in love with that technique, and we used it often on *Apt Pupil*. But on *X-Men*, we had great sets that we wanted to show off, and I explained that I'd prefer to shoot in anamorphic — however, it also that meant he'd have to give up the zooming. He agreed to that in part because he wanted to give this film a bigger presence and scope, but it wasn't always easy to get him away from that technique once we started shooting."

The film's visual-effects requirements also had a major impact on its overall look. Sigel notes, "We were trying to create things that are close to impossible, so I really had three primary collaborators on the look: Bryan, because everything started and stopped with him; our visual-effects supervisor, Mike Fink [see additional story on page 94], and production designer John Myhre. We went through every scene and shot, discussing where my work ended and Mike's began, how our two worlds would interface, what John would build and what the computer would create.

"A lot of Mike's decisions about how shots would be executed were driven by time and money [considerations]. Do we use a miniature? Can we do this in CG, or should we build an actual set? We had to figure out what each approach would cost us, and if we couldn't figure out how to do a shot at a reasonable cost, it was cut."

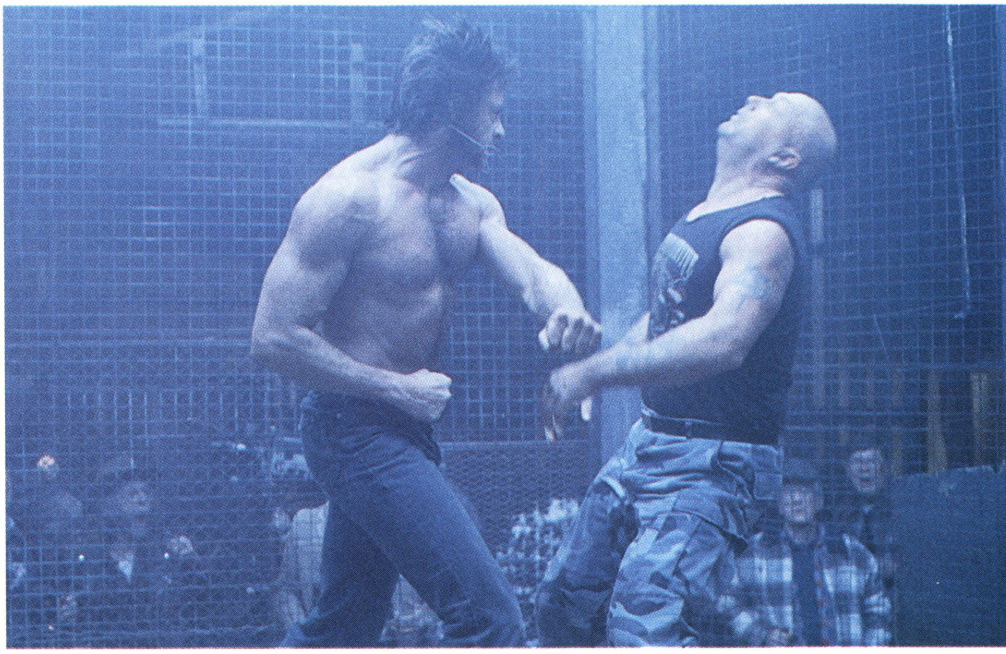
To illustrate this process, Sigel points to an early scene in which a vehemently anti-mutant U.S. senator (Bruce Davidson) is kidnapped by Magneto and imprisoned within a cavernous, underground lair. Carved into a rock wall, the senator's cell is situated on the edge of a chasm. Looking through the bars covering the cell's opening, the senator can see Magneto on the opposite side of the abyss. But with a mere wave of his hand, the mutant commands the metallic substances within the cave to transform and construct a shimmering steel bridge across the gap, allowing him easy access the cell. Arriving at the opening, he wills its metal bars to part and enters.

The point of this sequence is to demonstrate Magneto's vast powers, and several key establishing shots were required to give the scenes scale. "Once we had those shots, the action takes place in the jail cell, which was a very small set," Sigel observes. "Bryan, Mike Fink and I had to figure out which shots would best depict Magneto's walk across this catwalk as it flies together. Our production designer, John Myhre, could determine whether it was impractical to build something like that walkway. Certain things, like adding an exterior or adding rooms, were more practical for us to do on set because I could do it cheaply and it looked better than it would in CGI. There were other things that were better for Mike to do. We ended up with a series of storyboards and 3-D pre-vis animations based on the sequence at hand.

"Bryan, Mike and I then determined what would be greenscreen elements, where the composites would be and whether we needed second-unit elements to make it work. That process involves a tremendous amount of organization, and it can be as frustrating for a cinematographer as it is for an actor when he's acting opposite an orange ball on a greenscreen. A cinematographer will always prefer a natural set and a natural actor to part of a set and a piece of green cloth, but that's filmmaking today."

Sigel shot the majority of the film's visual-effects work with Eastman Kodak's SFX 200T stock, while the bulk of the film was shot on Vision 500T 5279. "As always, when you're doing greenscreen or certain visual effects, you have much less leeway in terms of diffusion and unusual lab processes," he notes. "Although the SFX and 79 normally cut together pretty well, we had to do some digital manipulation to match the SFX to the way we manipulated the 79. It's possible to get away with that if it's done well." Deluxe Toronto handled the show's lab work, and Sigel gives the company high marks for its flexibility in handling "unusual processing."

All Singer needed were one or two shots to get Magneto into the cell "to give the audience a sense of the environment," Sigel says. "The cave includes a waterfall and [an obelisk-like] piece of stainless steel that's about a mile high, and how could we possibly build that practically? It ended up being done with a model and CG. However, I think one of the hardest things to do in terms of the effects is to create an environment completely from scratch. At best, fantastical CG environments often look exactly like what they are: photo-real illustrations." ➢



X marks the spot as Wolverine connects with a solid left hook.

Unusual Suspects



Above: Sabretooth (Tyler Mane) prepares to wreak havoc in a train station. Below: A helpless Storm (Halle Berry) listens as Sabretooth details her fate.

According to Sigel, Singer's work has a high "realism" factor. "I think his biggest fear is that something may look fake. Having said that, I have yet to meet anybody who can bend metal with his mind! We were dealing with an extreme level of unreality, but you have to buy these characters or there's no story, no conflict."

Sigel spent additional prep time doing camera and lighting tests on the mutants' costumes and makeup treatments. "The biggest problems were with the X-Men costumes. Superhero costumes can be drawn in a comic book and look really cool, but they are very difficult to reproduce faithfully on a human being. Even Arnold Schwarzenegger doesn't have a body like the characters in the comics! The costumes generally look ridiculous, and movement is a problem as well." The cinematographer found that the details of the X-Men uniforms — each sculpted to highlight a character's form — benefitted from side and edge light, which created interesting glints and textures and separated them from backgrounds.

One character — the devilish Mystique (Rebecca Romijn-Stamos) — proved to be particularly difficult in regard to makeup tests. Her full-body makeup featured scale-like appliances covered with an indigo-blue paint, set off by yellow contact lenses and a bright red wig. Applying it all was minimally a six-hour process. "She's basically naked in the film, covered only in body paint and prosthetics, and I was very impressed with [Gordon Smith's] makeup job," Sigel says. "It was important to find a way to photograph the makeup so it looked real."

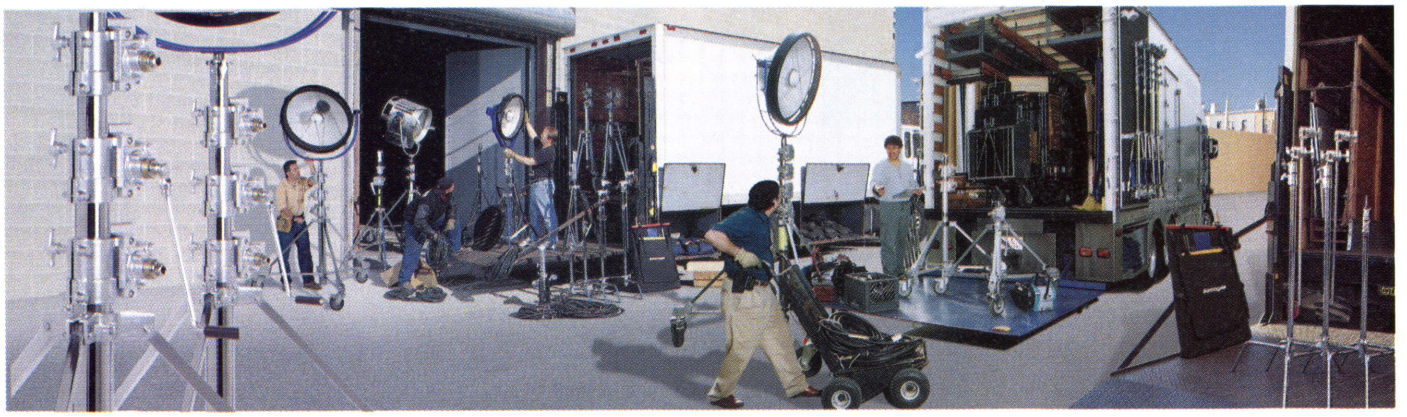


Mystique appears in a limited number of scenes, so Sigel was able to conduct his tests on Romijn-Stamos using a lighting setup that was based on how the actual scenes would be shot. He explains, "The plan was to light her properly and then do it in a gradually more unforgiving way, so Bryan could see what the limits were." Again, Sigel relied on a side halflight to bring out textures. "Rebecca was lit with very large sources to create a uniform sheen, and we then used little, hard kicks to bring out the three-dimensional quality of the scales, creating a bit more range in the textures and keeping the sheen from looking too flat."

Production on *X-Men* began in September of 1999 and wrapped in March of 2000. Filming took place primarily at locations and stages in and around Toronto, although a cursory amount of filming was later done in New York City. Because of restrictions on U.S. productions imposed by Canada's guilds and government incentives programs, Sigel could only take two of his regular crew members to Toronto: chief lighting technician Tony "Nako" Nakonechnyj and first camera assistant Jimmy E. Jensen. "Great focus pullers are a rare breed, I don't know what I would've done without Jimmy," says Sigel.

Nako and Sigel first worked together on the telefilm *The Rock Hudson Story*, and they've since worked together on a number of

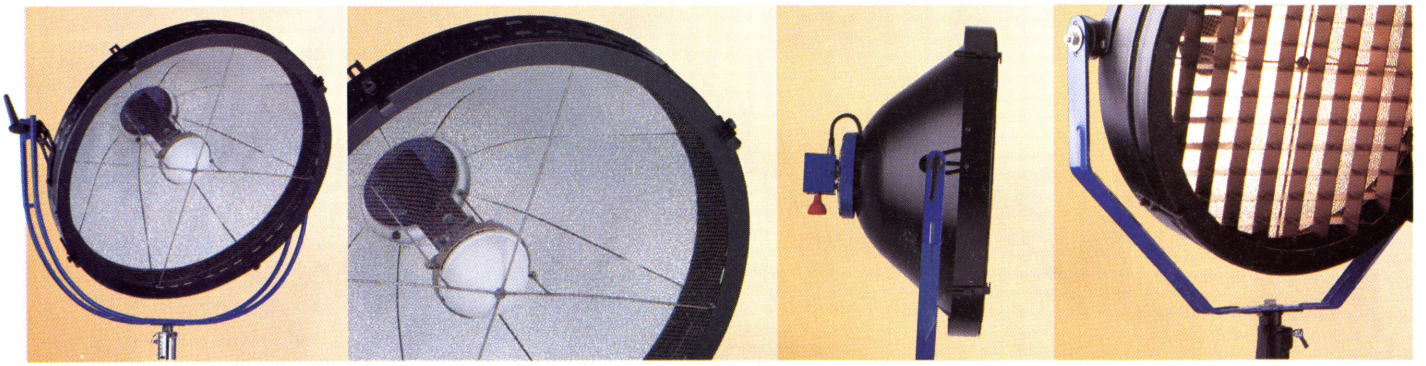
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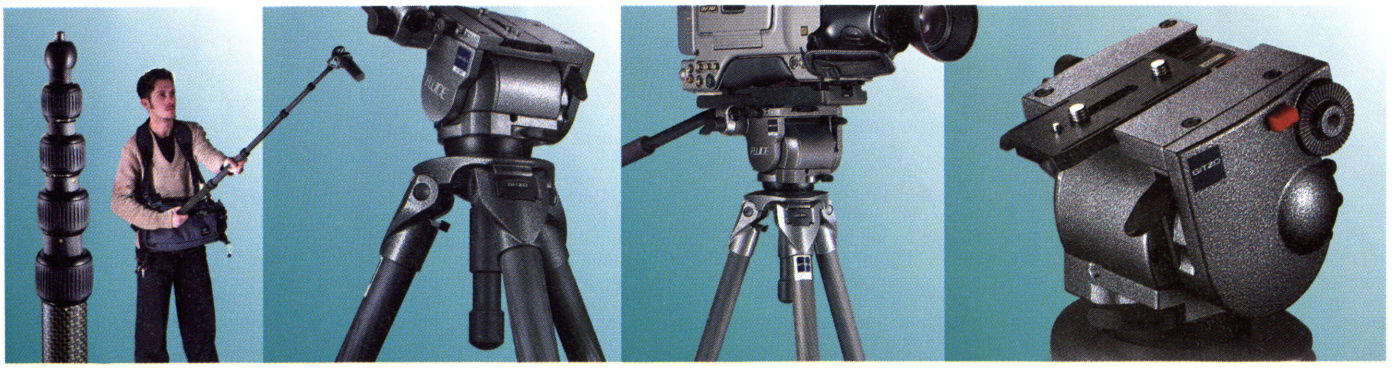
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Unusual Suspects



A crewmember gives actress Halle Berry her focal point for a scene that will later feature a CGI effect.

projects, including all of Sigel's features since 1994's *Foxfire*. "Tom allows me to have the kind of creative input that usually only a cinematographer would have," Nako says. "It's been a great collaboration. [On *X-Men*,] there were a lot of political issues to overcome. The union officials in Canada felt that their people could do the job. There are good people up there, but the relationship between the chief lighting technician and the cinematographer is an important one. Tom needed somebody who understood his vision and creative process, and he really fought for me." The final agreement allowing Nako to work on *X-Men* required that a Canadian gaffer be hired as well.

Sigel soon found that shooting a complex picture in Toronto was a thorny task. "They just don't have the kind of stages that one would normally associate with a production like this," the cameraman attests. "We had to downsize a number of sets and use CGI where we wouldn't ordinarily have had to, because we just didn't have enough room. They have good stages in Toronto, but they [either] don't have enough or they aren't equipped the way [they are] in Los Angeles. That meant we compromised certain shots when we might have needed a really high angle and couldn't do it, or compromised the lighting because we just didn't have the [necessary] space. Fortunately key grip Mark Manchester was very inventive with the space we had."

Nako reports, "We were working at Shoreline Studios, which had some of the biggest stages in Toronto, but they were more akin to converted warehouses than Hollywood studio stages. Our biggest was 14,000 square feet, while the others were 7,000 and 10,000. On a stage in Los Angeles, you'll have the perms and then the ozone area above that so you can just drop things in. We didn't have that capability in Toronto; everything had to be hung, meaning we had to bring our lamps up on a scissorlift or Condor. Our flexibility was limited."

One tool Sigel utilized to help him get the most out of his sets was Kodak's PreView System (see *AC* Aug. '99, p. 36), which was supplied to him just a few weeks before he started the film. He says that while the device is intended to give cinematographers a means by which to communicate to the director and other crew what effect changes in film stock, filtration, focal length and processing might have on a subject, programming it proved problematic. "Unfortunately, we were usually making our decisions based on looking at the LCD screen on the PreView's laptop computer, which is a backlit source and looks nothing like the printouts," he recalls. "We rarely had enough time to output the printouts while working.

"Bryan draws very much on the stimulus of the location, so the PreView was useful for choosing camera setups and angles; I could shoot a location with stand-ins, then bring those images right to him," Sigel continues. "There were some locations that he initially didn't see the value of, but I was able to go there with the PreView, shoot the place the way I saw it, then show him the results. He'd say, 'Oh, yeah, now I see it.'"

Flashing back to World War II, *X-Men*'s opening sequence depicts Magneto's backstory, establishing his need for vengeance against humans in light of their intolerance toward mutants. "As a young boy, he was taken to Auschwitz and was separated from his parents before they were sent to the gas chambers," Sigel details. "The trauma of that event brings out his latent mutant powers. One thing that makes Magneto interesting is that there is a tremendous amount of legitimacy in his argument. You see that his hatred for humanity was created out of the suffering and misery he experienced, so I wanted the opening to have a feel that was very horrific."

The Auschwitz exterior was rendered in drab colors, with muddied ground and rain effects. Manchester hung a 60' x 40' silk from a construction crane over the set to create an overcast effect. Sigel then shot the sequence with Kodak's EXR 5245 and employed a Deluxe skip-bleach process on the negative to increase contrast and further desaturate colors. "I find 45 to be a colder-looking, contrasty film," he notes. "It's almost as much a tungsten film as it is a daylight film. It's also very fine-grained, so even when doing a skip-bleach, the grain doesn't jump out that much, although this scene is grainier than the rest of the film."

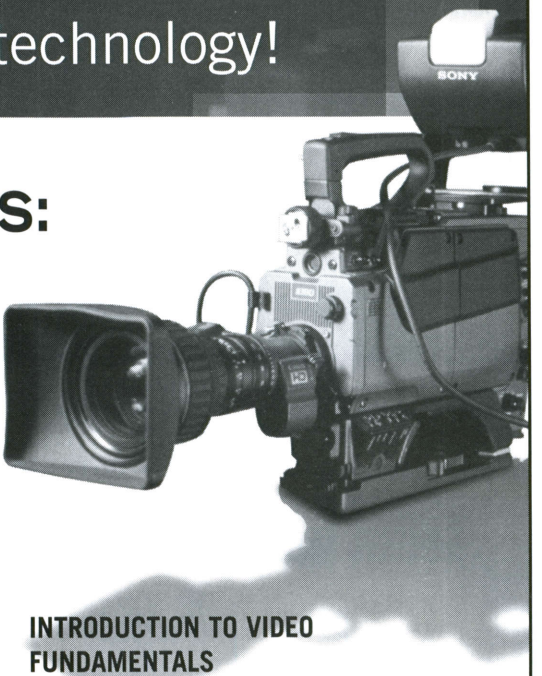
As he had on both *Fallen* and *Three Kings*, Sigel used the unique look of cross-processed Ektachrome

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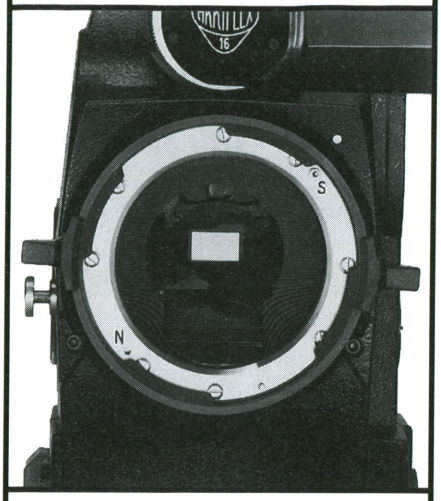
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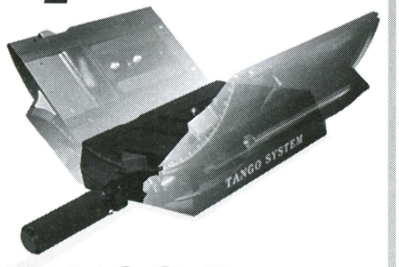
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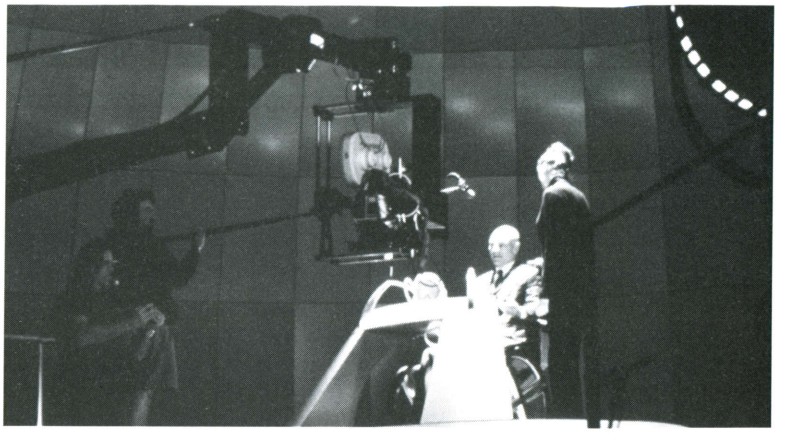
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Unusual Suspects



The crew sets up a shot of actor Patrick Stewart with a fully articulating camera head.

reversal film for another *X-Men* flashback, this time to represent the anguish of Wolverine's nightmarish past. "Wolverine has a recurring nightmare based on what happened to him at a secret military lab," Sigel describes. "He doesn't remember exactly what happened beyond a few fragments, so I wanted to photograph the sequence in a way that represented that feeling."

Toward that end, Sigel shot the scene with Kodak's 5285, a reversal stock he actually had a hand in bringing to the market. "I'd previously used bulk loads of various still-photography films in doing this kind of work, including Kodak's Ektachrome Professional Plus. But for *Three Kings*, I knew we were going to do a huge chunk of the film with it — the entire second act — so I asked Kodak to make us 1,000-foot loads of Ektachrome with edge-coding and Bell & Howell perfs. They were very hesitant to do it, but we ended up shooting 200,000 feet of it, so they were happy in the end. They decided that there was a market for the stock, and they now offer an advancement of it called 5285."

The cinematographer wanted Wolverine to appear hot and feverish in the sequence, so he overexposed by about a stop, bringing out hot highlights along the character's body. However, the cameraman notes that because of the 85's dangerously low latitude, over- or underexposure can only be done with extreme judiciousness. "The stock has such a very narrow range that I'd always recommend someone do tests before using this technique," he notes, "but I've used it quite a lot. The 85 is daylight-balanced, so using HMIs or daylight will give you the most 'normal' effect, even with the cross-processing. How far you want to shift away from that is up to you. You can to it with the color temperature of your lights or with your production design, because certain colors will really pop."

Much of *X-Men* takes place in Professor X's school for mutants, where he teaches them how to control their powers and interact with society. From the outside, the academy looks like a stately mansion, but underneath the building is a hidden hotbed of superhero activity. Featuring built-in lighting panels and stainless-steel finishes, the facility's rooms include a laboratory, a chamber called the "Cerebro," and a number of lengthy corridors. Finished in dark-blue, high-gloss coatings and stainless steel, the industrial-style hallways feature continuous lighting coves built into both the floor and ceiling corner joins. They were filled with bat strips, covered with curved opaque plastic panels and wired through dimmer boards, allowing Sigel to easily "redress" the set with his lighting.

"Tom really likes to use dimmers for exactly that reason," Nako says. "He likes the flexibility of riding the intensity of the lamps, or even doing lighting changes in-shot. Given the fact that so much was happening with practicals on very large sets — our main corridor was about 120 feet long — using dimmers was much faster than having 50 guys adjusting things by hand. One board operator could do it all. We used about 3,500 #1 Photofloods in our bat strips in the coves, and each 4 foot strip was the equivalent of 2K. The dimmers allowed us to run the coves at different intensities and create different moods, with the main portion of the light coming either from above or below the actors."

Because of the lighting coves, the corridor walls had to be suspended in midair, with a scaffolding truss system holding them up from behind. Sigel admits, "That added a lot of trouble and expense in the construction, but I was really determined to have these coves on both the top and bottom because it gave the lighting more shape and kept it from becoming a supermarket-like, fluorescent environment."

These coves (as well as other overhead practicals built into the ceilings which contained 6K space lights and 1K Par cans with SFP globes) gave Sigel a strong base ambience, allowing him to shoot at his set stop, a T3.2/4, using 5279 stock. Additional illumination was relegated to a few floor lamps for modeling, including Aurasofts, which offered an illumination that closely matched what was coming from the coves.

The Cerebro, an enormous spherical room, serves as Professor X's interactive meditation chamber. Once he's plugged into its computer platform, which is built into a central dais, the space becomes a planetarium-like display of his psychic revelations, with images appearing upon its curved



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walls. "Because this room is huge, we could only afford to construct a portion of it," Sigel says. "A section of curved wall was built and mounted on a track, allowing us to move it around the center platform where Professor X sits, so we could shoot from any angle and still have the correct background. All we built was maybe a third of the circumference of the sphere — no top and no bottom."

Professor X's gleaming laboratory is more sophisticated in terms of the practical lighting, which primarily consisted of Par cans and space lights built into the finished ceiling. Sigel and Myrhe built the sets with hard ceilings to make extensive use of low angles, giving more options in terms of reflections. "Reflections were a very big element in the production design," Nako confirms. "It was something we capitalized on throughout the film, not only in Professor X's world but also Magneto's, because we were highlighting [the latter character's] capabilities over metal. Myhre wanted those materials to cross over into both of these worlds to suggest a sort of similarity between the characters."

During the film's denouement, a large group of international dignitaries gathers on Ellis Island to discuss world peace and the need for mutant registration. Little do they know, but Magneto has positioned a device on the Statue of Liberty which emits a blinding-white energy blast that will instantly transform them all into mutants, compelling them to end their persecutory ways and allow the Evil Brotherhood to dominate the world.

Standing in for Ellis Island during the shoot was an old school building in Toronto, and some 500 extras portrayed the world leaders. Sigel's real test was to create a portion of the energy-blast effect practically. "The 'mutant energy' not only had to wash over 500 people, but also overexpose and burn them out white, so it had to be really bright," he describes. "Because I had a feeling that a lot of this was going to have to be a visual effect, Mike Fink and I talked about the scene, especially in regard to what we would have to do with the lighting in the wide shots."

Sigel, Nako and their crew began by building a massive fixture to represent Magneto's energy source, consisting of 12 Dinos mounted together on a horizontal, metal truss fitted with a hydraulic system that allowed the entire fixture to be tilted. "We called it the 'X-Light,'" Nako says. "It was about 40 feet across by 12 feet high, and we used very narrow, 1K Par spot globes



— VNSPs — to give it extra punch."

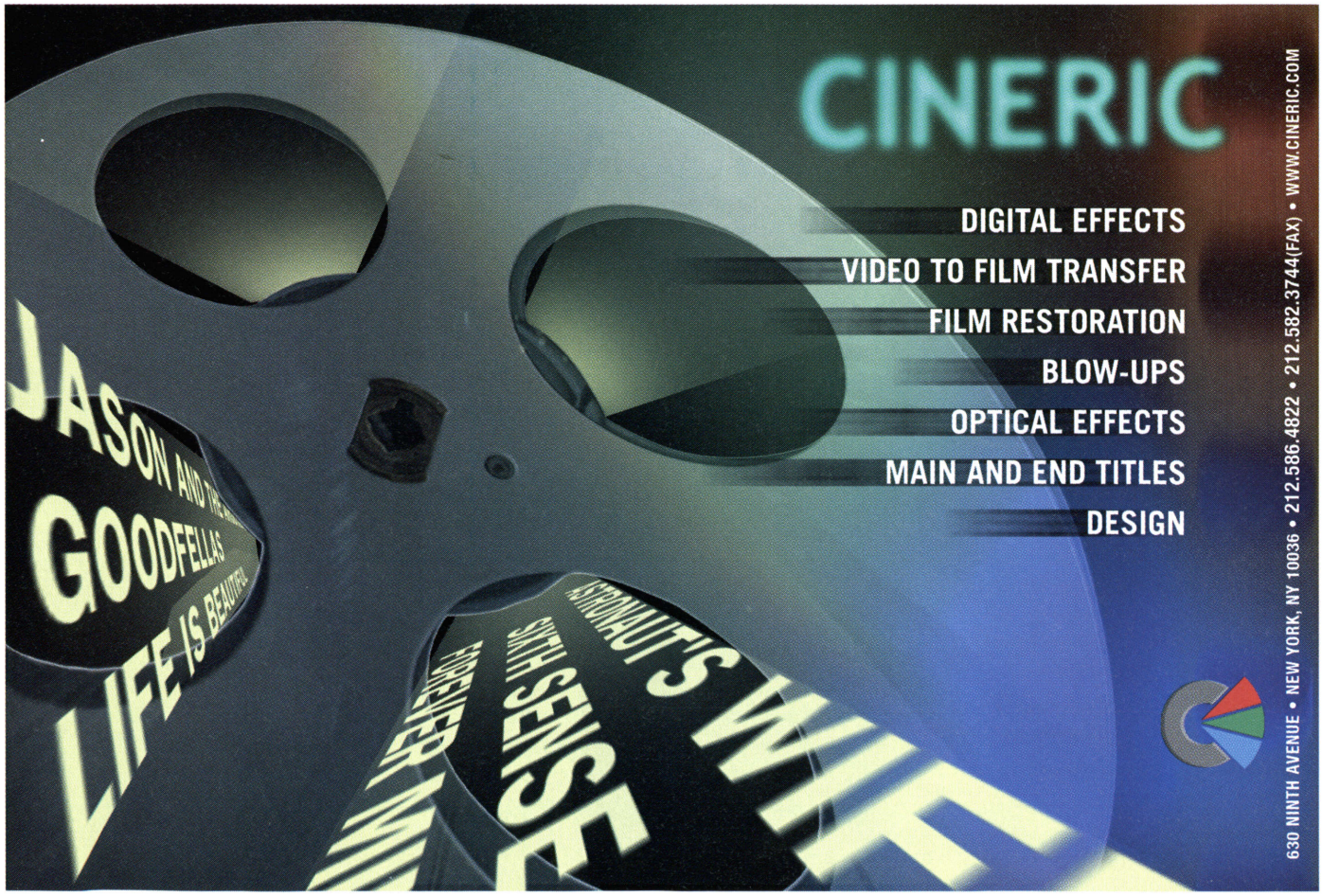
"The truss was hung from a construction crane," Sigel continues. "In the ready position at ground level, it was powered up and hidden behind a huge flag — that way, it would always be at full intensity. By using a block-and-tackle system, we were able to pull it up to about 100 feet in the air in about 2 ½ seconds, creating this wash of intense light crossing over the scene." As the fixture was raised, it was gradually tilted downward, allowing the most intense portion of the illumination to remain fixed on the crowd below. "It was built by Dwight Crane in Toronto specifically for *X-Men,*" says Sigel. "Bryan Dwight is truly one of the great Canadian resources."

Nako details, "Because the X-Light was moving, the shadows rake across the ground very dramatically. The effect was suggested by that scene in *The Truman Show* in which the guys in the control room on the moon 'cue the sun' and it just pops up over the horizon. That's what Tom had in mind."

Despite the combined power of the dozen Dinos, Sigel had to overcome the exceptional overexposure latitude offered by the 200-ASA SFX film stock. "Going three, four or five stops over isn't like it used to be — it's not a big deal," the cameraman admits, noting that the X-Light offered him about five stops of overexposure while shooting at a T4. "Bryan decided it worked so well that it saved us from having to a number of visual effects. It was one of those happy occasions when we were able to exceed expectations."

Another configuration of Dinos — four 36-globe units with VNSPs mounted in a square configuration and hung from a crane — was used for this scene as a moonlight source, creating the base light. "That one was called the 'BFL' — the big f***ing light!" Nako relates with a laugh. "It was mounted to a platform, allowing each of the Dinos to be independently tilted and panned so you could spot/flood them and feather the light out."

Noting that the storytelling success of *X-Men* will rely on striking the proper balance between its parallel dramatic themes and superhero-style action, Sigel concludes, "There's the core of this movie, which is played out in the dialogue, and then [there are] action sequences that are the consequences of the dialogue. My guess is that the dramatic aspects will be toned down to make room for the physical-action aspect, to make it 'interesting' for the younger audience. I think that's a struggle for Bryan; he took the film on because it had a dramatic center, and I know he won't want that to be lost." ■



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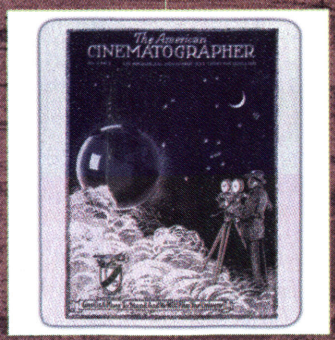
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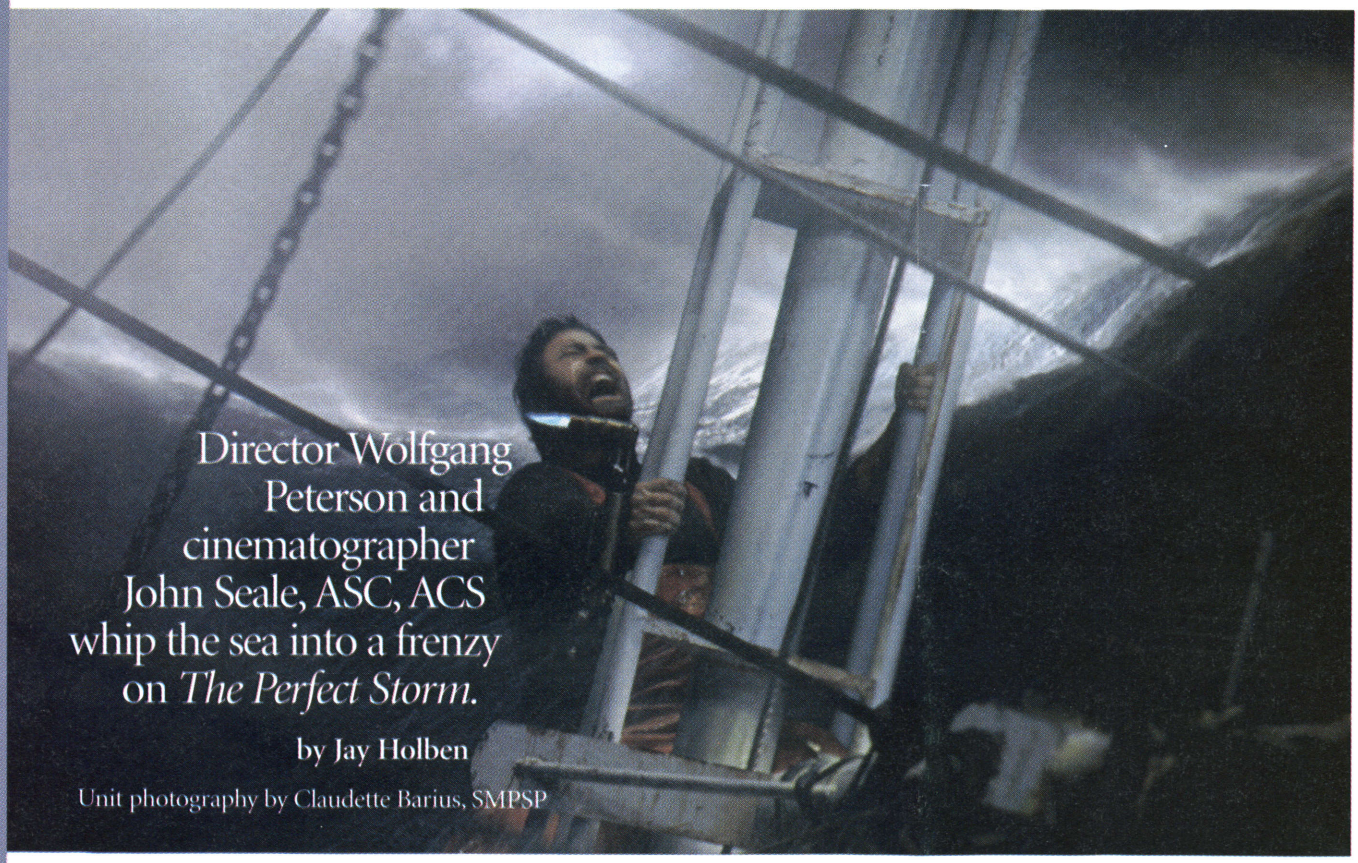








Sound and Fury



Director Wolfgang Peterson and cinematographer John Seale, ASC, ACS whip the sea into a frenzy on *The Perfect Storm.*

by Jay Holben

Unit photography by Claudette Barius, SMPSP

A mature hurricane is by far the most powerful force on earth; the combined nuclear arsenals of the United States and Russia don't contain enough energy to feed a hurricane for even a single day. On October 30, 1991, Hurricane Grace was raging approximately 300 nautical miles off the coast of Nova Scotia, fueled by another northern high-pressure extra-tropical storm, when it collided with the Gulf Stream and intensified into a meteorological anomaly that had not been recorded in more than 100 years — something the National Weather Service dubbed "the perfect storm."

The storm, also referred to as the Halloween Nor'easter of 1991, created winds in excess of 90 knots (or 104 mph) and waves of 110 feet — the highest ever recorded. Nautical physics dictate that a single, non-breaking wave of any size is incapable of sinking a ship, but a breaking wave of 100-110 feet has enough force to crush the hull of any ship and can even flip an aircraft carrier.

The longliner fishing vessel *Andrea Gail* was about 300 nautical miles off the East Coast and on heading back to Gloucester, Massachusetts, full of fish, when she ran straight into the perfect storm. She never reached port.

Photos courtesy of Warner Bros.

Setting Off

In his best-selling book *The Perfect Storm*, journalist Sebastian Junger chronicles the struggle of the six-man crew aboard the *Andrea Gail*. Teaming up for the first time to bring this tale to the screen are Academy Award-nominated director Wolfgang Peterson (*In the Line of Fire, Das Boot*) and Academy Award-winning cinematographer John Seale, ASC, ACS, whose credits include *The Talented Mr. Ripley, The English Patient, Gorillas in the Mist* and *Witness*. "I was very excited to come onto this project," says Seale. "It's an amazing true story, and I was ready and raring to make a go at telling it. Being a yachtsman myself, I wanted us to be as real as we could and not deliver a 'Hollywoodized' version of reality. I felt that out of respect for the fishermen who were caught in that storm and the Air National Guard boys who had to ditch their helicopter in the middle of it, we needed to give the audience a reality they would never expect.

"I come from an upbringing of low-budget films, and my brain always clicks back to how to accomplish a given task in the most economical manner," he continues. "When I read the script, I thought we should go to South Africa, to the cape of storms, wrap the camera up in a bit of plastic and go for it! I arrived at Warner Bros. ready to go off to Africa, and they looked at me as if I was on drugs. They said, 'No, think Stage 16,' and I said, 'What?!'

"Of course, it all came together very quickly. I didn't know that Industrial Light & Magic had already been doing extensive work and tests on generating three-dimensional waves on the computer. I just sat there in awe and thought, 'We're going to do a major, apocalyptic storm on a soundstage! That's fantastic! The result is that all of the storm footage was shot on stage."

Although the majority of the film's nearly 90-minute storm sequence was fabricated on stage, the story was not entirely photographed there. Early on, the production traveled to Gloucester to shoot the film's opening sequences at the actual wharf where the *Andrea Gail* had launched. While shooting there, the production was graced with the presence of a hurricane that was traveling north along the U.S. coastline. Second-unit director of photography Walt Lloyd raced out to capture footage of the real thing. "When the hurricane came up the coast," recalls Seale, "Walt was the first one out there. He got cold and wet and was incredibly happy, and he got some terrific second-unit stuff of the *Hannah Boden* [*Andrea Gail*'s sister ship] in at least 8-foot seas that were breaking over the bow.

"The problem was that the real hurricane looked like calm seas compared to the 110-foot seas that the *Gail* encountered in the middle of the 1991 storm! We did use the real storm sequences in the film, but we used them to represent fairly calm seas! When the first unit went out there, the seas had dropped by three or four feet, but even in just 5- to 6-foot seas everybody was sick and rolling around and saying, 'Isn't it rough?!' It made us all stop and think, 'My God! Can you imagine what 110-foot seas would be like?' It's truly horrifying."



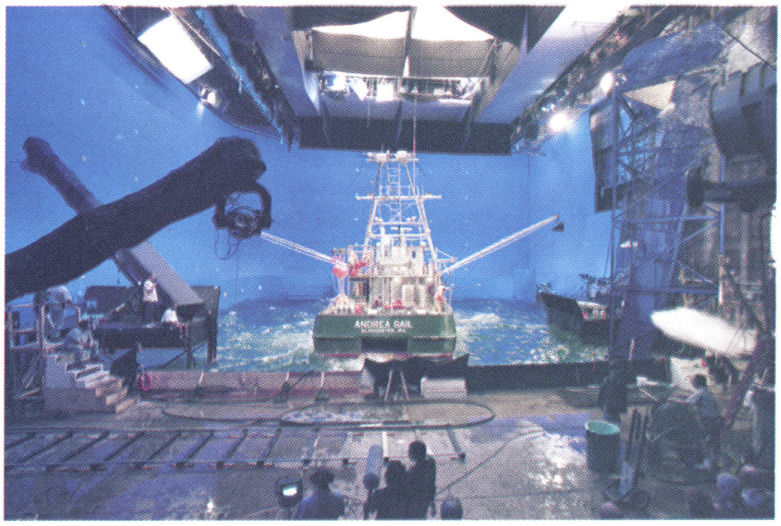
Opposite page: Trapped in the teeth of an apocalyptic storm, Captain Billy Tyne (George Clooney) battles to hold his boat together. This page, top: On Stage 16 at Warner Bros., a mockup of the *Andrea Gail* is subjected to artificially manufactured elements. Below: The boat's wheelhouse is sloshed with water.

Heading Into the Storm

The task of re-creating a monolithic storm on stage reduced Seale to cold sweats on a number of occasions. Before Seale joined the production, Peterson worked extensively with storyboard artists to sketch out nearly every scene in the film. When the cinematographer began sitting in on meetings in Los



Sound and Fury



Two views of the 72' *Andrea Gail* mockup floating within the Warner Bros. soundstage, where it was surrounded by a greenscreen to facilitate the later addition of digital visual effects. Note the hydraulic crane base (bottom photo) that was specially built in the water tank by engineering wizard Ralph Kerr; the platform could lift four feet out of the water to clear the waves and allow the crew more shooting flexibility.

Angeles, he remained quiet as Peterson meticulously went over the shots with the artists, methodically paring the elements down to what was necessary. "I was a little behind when I first got to Warner," Seale confesses, "and I spent some time merely listening, trying to pick up Wolfgang's process. I am a great believer in a cameraman doing that. I think Wolfgang might have been a bit worried that I wasn't contributing directly right from day one, but I don't do that. I sit and listen quietly to what the director wants, and I absorb his plan. That way, when I do jump onboard, I've got both feet firmly planted and I'm on the same wavelength as the director; we're making the same film."

Size Matters

When the storyboard process was completed, ILM took the boards and created animatics, which included technical information based on calculations such as lens size and camera positions. Right off the bat, Seale discovered that a number of shots simply weren't possible within the tight confines of Stage 16. "That's where I became very active in the overall decisions for the film," he recalls. "This was the movie coming together shot by shot. Bill Sandell, the production designer, was handing me scale drawings of the sets and I was poring over them with a fine-toothed comb, trying to decide how we were going to do all of this.

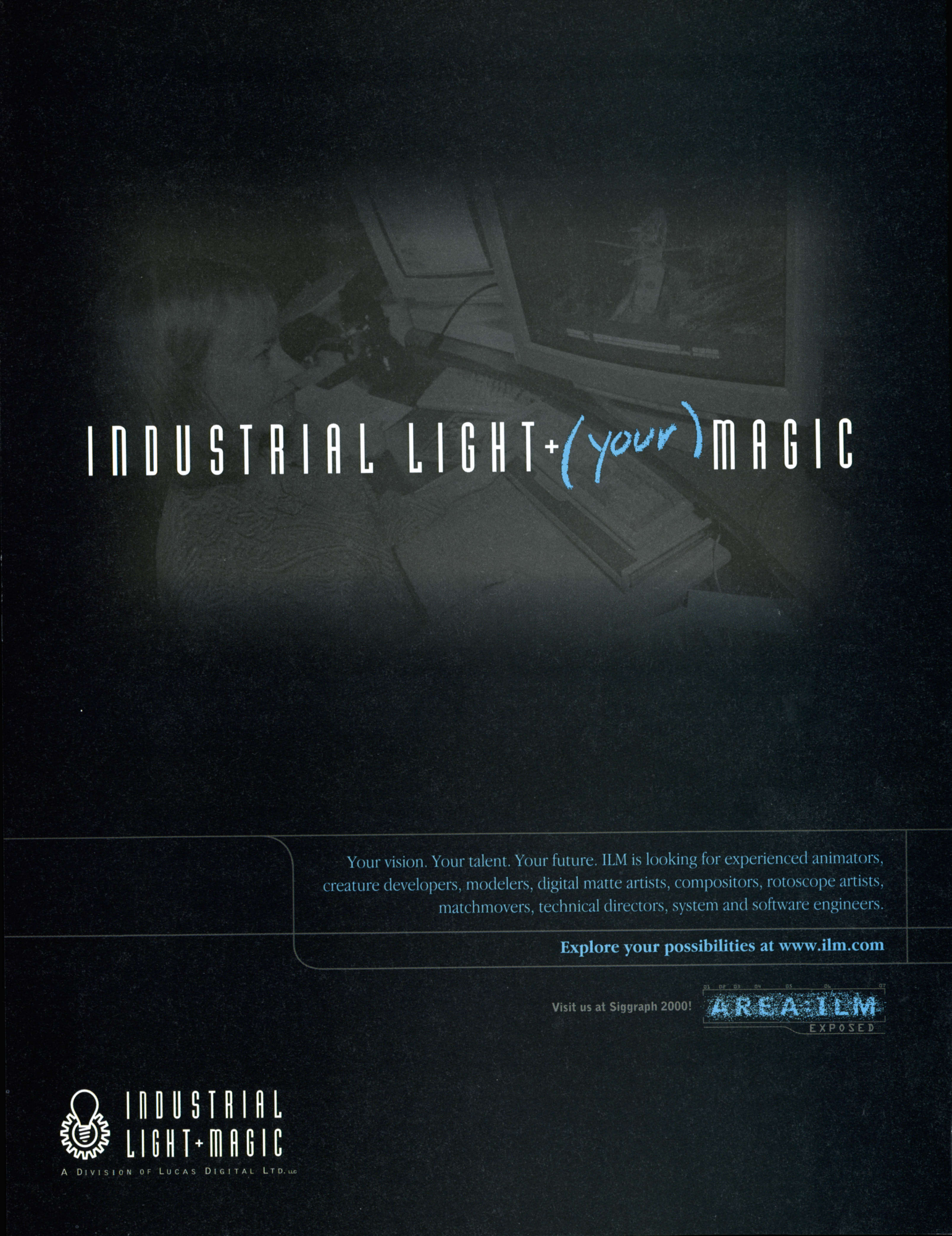
"I quickly realized that we couldn't do a lot of the shots we were planning! We had a small lip around the water tank, and I figured we could use Super Technocranes to get us out a good distance and give us a great deal of flexibility. However, that would only give us a 28-to 30-foot reach in each direction, for a total of about 60 feet. Some of the shots that were coming back in the animatics were moves of over 100 feet! I raced through the animatics and found a lot of shots that we simply couldn't pull off unless we put an Akela crane on the stage, but I also realized that there would be no room to swing it around at all. About two hours into wracking my brain, I was in a deep sweat.



"I told Duncan Henderson, our executive producer, 'We can't do this the way we're thinking. The shots are too big.' The trawler was 72 feet long, the tank was 100 feet long and one of the shots started off the bow, went right down past the ship and turned around to look back over the stern — for a total of about 140 feet! We didn't have anything that would have that kind of reach from the stage floor. We'd have had to build tracks over the water every night just to pull off a single shot the next day, and then we'd have to rip it all down again. We came to realize that the only way many of the shots would work was if we put the crane bases in the water. Our savior, Ralph Kerr, a hydraulic-engineering genius, said he could build us a platform that would float around the tank while supporting the crane, crew and everything else; when in position, it could hydraulically lift four feet out of the water to avoid the waves and be ready to shoot. He went off and built us two platforms that did exactly that. They were lifesavers, because we could put the crane bases anywhere we needed to get the shots."

Dead Reckoning

Solving the platform problem was only the first major obstacle



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Sound and Fury



A dump tank unloads a "wave" on the deck of the faux boat as a remote-controlled camera captures the action.

Seale had to overcome. Throughout the course of the storm, the film tracks a half-dozen different vehicles, including Para-Rescue Jumper helicopters, a Coast Guard Cutter, a 32' sloop, the *Hannah Boden* and the *Andrea Gail*. Seale's first concern was establishing rules for maintaining visual continuity amid the chaos of the storm. "It became a very logical process of breaking down the complexities of the sequences into numbers," he says. "One of the first things we had to do was carefully figure out the camera and lighting continuity; I knew we couldn't easily move around anything on the stage, so we had to have our homework done. I sat down with Wolfgang, and we agreed that the camera should always be south of the whole geographic action and looking north. That way, when the longliners leave the East Coast to go out to the Grand Banks, they'll be traveling left to right. When they fill their hold and head back, they'll be moving right to left. Once they get into trouble in the storm, [the rescue crafts that] come out to help will all be going left to right.

"Once we had the geographic continuity breakdown figured out, I drew up a map of the coast and waters showing where each vessel would be at any given time and which direction they would be heading. Then I could break down the scenes and know, for example, that in Scene 147 the *Andrea Gail* turns into the storm and punches through the waves in slightly southwestern direction, meaning she's going right to left and coming toward camera. We'd need to position the dump tank in the lower quarter of the stage, the wind machines on the north and east walls, and the camera platforms over toward the bow a bit. It all came down to numbers — that's the only way you can make it through that much information and that many variables and still come out on top. There was no time or money for guesswork."

The cinematographer's next concern was how to graphically represent the trawler's position between crests of 100' waves in a tank only 20' deep. The boat was mounted on a custom-designed, multifaceted, six-ram super-gimbal that was able to simulate the pitching and rolling of an oceangoing vessel. To capitalize on the boat's motion ability, Seale employed tri-axial remote camera heads from Libra on the ends of the Super Technocranes. Interpolating data from ILM's projections, which were based on real meteorological data, Seale determined that 100' waves would have a period (or distance from crest to crest) of approximately 700'. At any given moment in the narrative, the trawler would be rising up the crest, crashing down the backside or lying momentarily in the trough between waves. "The wave machines in the tank could produce 4-foot waves," Seale recalls. "Obviously, we couldn't build a tank large enough to create 100-foot waves, so we used camera angles to stimulate the rise and fall

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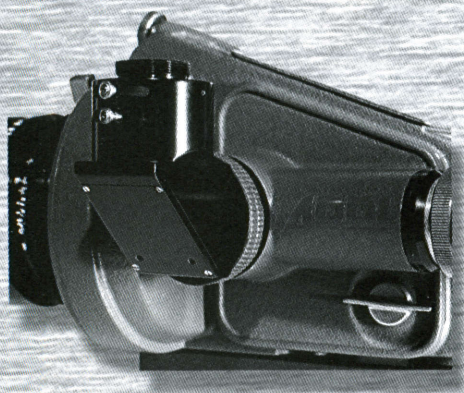
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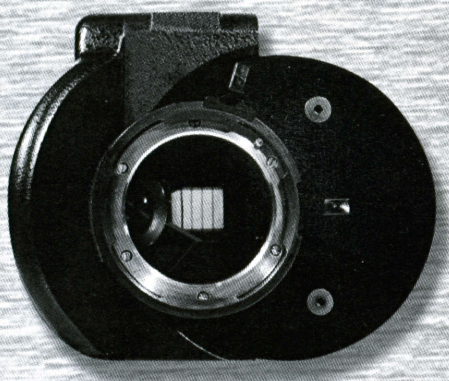
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Sound and Fury



Captain Tyne risks life and limb as he attempts to cut loose a flying anchor at the height of the storm's wrath.

of the boat. The third axis on the remote head gave us that angle. As the boat would round the crest of the wave, we would release the dump tanks to simulate the breaking water. It worked fantastically."

Reefing the Main and Battening Down

Surrounded by 2,500-gallon dump tanks, 100-m.p.h. winds, water cannons and rain machines, the actors aboard the *Andrea Gail* were not the only ones constantly drenched — so was the gear. From the beginning, waterproofing the equipment was of paramount concern. Seale also tried to eliminate the possibility of condensation. Compromising between that concern and the actors' comfort, the water tank on Stage 16 was heated to 82 degrees, which helped abate temperature differentials and reduce the chance of condensation.

The cameras were also placed in waterproof housings. Because they were working off of remote heads, the sheer weight of a hard case was just not a possibility, so Seale and first assistant cameraman Trevor Loomis turned to Pete Romano at Hydroflex for the solution. Romano designed a soft-bag system for each of the cameras, and he and Loomis designed an air-curtain system for the mattebox of each camera to keep water from collecting on the glass. Using two points of pressurized air, one in each corner of the box, they created double planes of air curtains, which helped keep the majority of water mist out of the mattebox and blew away the larger drops that landed on the glass. The system, unlike the rather unwieldy and not-too-waterproof "spinner" rain deflectors, was light enough to be employed on handheld cameras as well as on the remote heads.

Taking the idea one step further, Loomis designed a pressurized air system inside the soft bags. Running air through filters to make sure it was absolutely dry, Loomis pumped the waterproof bags up to create a slightly-higher-than-ambient air pressure and eliminate any potential ingress of water. The system was a great success, allowing the cameras to be literally submerged without sustaining water damage.

Seale was also concerned about the extra liability of working with block batteries to power the cameras. Not only were they extra weight, but they also would have to be constantly replaced as the batteries ran down. To eliminate this inconvenience, the crew created a power-conversion system and ran AC power up the arms of the Super Technocranes that was then converted to DC voltage to serve the cameras, heads and any accessories. Further refinements allowed variable outputs of DC voltage to service a great range of power requirements.

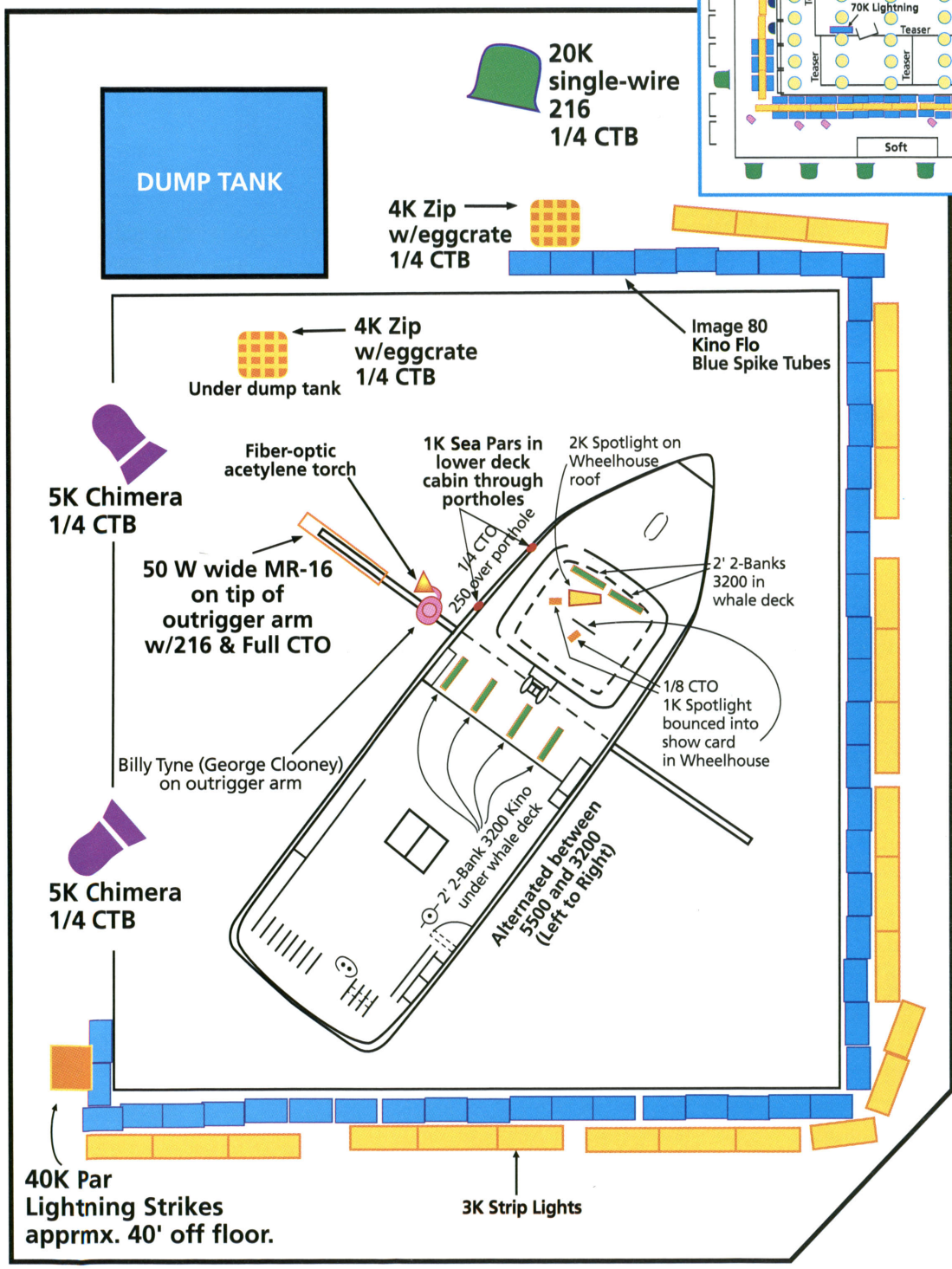
"We booked the Super Technocranes from day one," Seale says. "I really could not see working without them. One rule we made very early on was that we would never attach the cameras to the boats,

PERFECT STORM

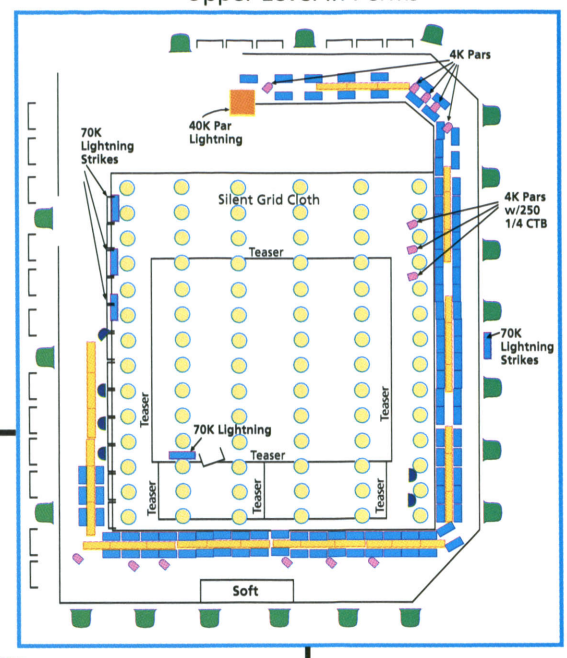
Stage 16 *Andrea Gail* Wheelhouse

GROUND LEVEL LIGHTS

MC Process with Stage 3 storm drop



Upper Level in Perms

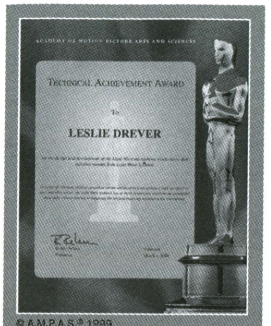


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Second assistant camera and documentarian Heather Scobie was given the monumental task of recording lighting positions, camera movement and general camera continuity notes for each sequence in the film. "This diagram was of scene 157," Scobie offers, "which was during the height of the storm. George [Clooney] must climb out onto the ship's outrigger to cut loose the sea anchor, which is flying around in the wind and ripping apart the boat. Overall on Stage 16, John [Seale] created a general soft wash with 89 10K Sky pans through an 80'x 60' silent frost diffusion and highlighted specific areas with 20K Fresnels from the perms [shown on the inset diagram]. For this particular shot, the #3 storm drop was placed on the back wall [from bottom along right hand side of page over the bluescreen], and the Image 80s were not used. John also had a fiber-optic acetylene torch rigged up for George to carry with him, and used the MR-16 at the end of the outrigger to create some interactive lighting for that effect."

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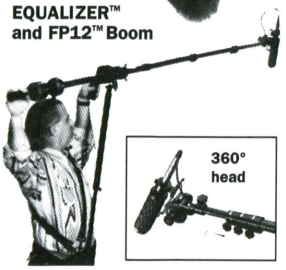
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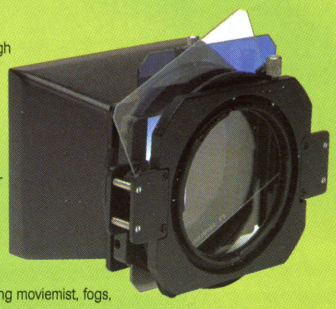
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Sound and Fury

because that would cause us to lose the frenetic energy of the boat's movement on the water. The cameras had to be free of the vehicles so we could get the full feel of their motion. Because we didn't want to lock the cameras down — for the safety of the actors, who were being thrown around on the gimbals — we would have to back the cameras away so that there was no danger of the actors being thrown into our gear. That meant I had to use zooms, which was no problem for me because I am a true lover of zooms! I think they're one of the greatest inventions ever, especially the 11:1 Primo zoom. We bolted one of those on each of the cameras and just let them rust there. Occasionally, we pulled out the 5:1 zoom, but for the most part the whole film was shot with my favorite lens, the 11:1."

Seale and Peterson also elected to shoot the film in the anamorphic format, which created its own set of considerations. The anamorphic zooms would be considerably slower than spherical zooms or primes, and there was also significant concern regarding focus because the entire film would be photographed primarily wide open at a T4.5. "I opted to shoot anamorphic rather than Super 35 because I felt the quality improvement was a significant advantage for this film," Seale asserts. "It made things a bit more difficult, however, because I had to light everything up. I just said to the guys in preproduction, 'Your stop is T4.5. Lock it off!' The 8-perf VistaVision cameras from ILM were all T4.5 as well, so the whole film was planned for that stop.

"Trevor Loomis and Cal Roberts [the show's A- and B-camera first assistants, respectively] pulled off the impossible," Seale continues. "We would be wide open on a 550mm anamorphic lens, shooting close-ups of guys being thrown around a gyrating ship while the camera was swinging around on a

Super Technocrane, and the shots came back sharp. Their concentration was incredible — under rather impossible conditions. Of course, we drove the actors crazy to get focus marks; Trevor would tell the gimbal operator we needed marks, and the operator would swing the boat over to its far extremes, which could sometimes be as much as an 18- to 20-foot arc! Actors like George Clooney helped make their jobs a bit easier, though. He was very disciplined; he'd say, 'This is my mark, this is where I'm going to be,' and he'd be there consistently. That type of precision, which isn't as commonplace as it should be, helps take a bit of the strain off the focus pullers."

Red Sky in Morning

Because of the massive amount of bluescreen photography and CGI work that was necessary to complete *The Perfect Storm*, the team at ILM — under the supervision of Stefen Fangmeier (see visual effects story on page 104) — required the use of Eastman Kodak's SFX 200, an emulsion with an improved red layer specifically engineered for traveling matte compositing. To help a bit with emulsion speed, Seale force-processed the SFX 200 one stop, rating it at 320 ISO, and turned to Kodak's EXR 200T (5293) for shots that did not require bluescreen work. This was a bit of a departure from Seale's normal repertoire, which consists primarily of Kodak's 500T emulsions (EXR 5298 and Vision 5279). Toward the end of production, Seale did turn to his old favorite, Vision 500T (79), over the EXR 200T (5293), rating the 79 at 400 ISO and gaining an extra one-third stop of speed.

Even at 400 ISO, a T4.5 requires a fair amount of light. In addition, the stage was going to be used for situations ranging from bright sun to the gloom height of the storm and for night, and Seale was determined to hang a versatile plot that would allow fairly seamless changeovers from one look to the next. To achieve this, gaffer John Carney and key grip Bill Young rigged a large 80' x 80' soft light to the perms in the stage, and also stuffed in some 89 10K SkyPans assisted by a ring of double 20K soft boxes (see lighting plot on page 57) to get the base stop, at full intensity, of T8 at 200 ISO. This large coop source created a soft, overall flat toplight that was perfect for Seale's needs.

"The look was, in one word, reality," Seale affirms. "It's a true story, and I felt we should all set out to create the awesome reality of an ultimate storm. Also, the logistics of shooting meant that every light that went in to light an actor was a major ordeal: it had to be waterproof and it had to be hidden from two or more cameras in tightly confined spaces. It just made each light a nightmare. Adding little flourishes like a backlight or a kicker was a major task, so I just didn't put them in. I went flat.

"Realistically, midday in the middle of a storm is very flat lighting, and considering the economics and reality of shooting this logistically monstrous film, I decided to forego a lot of the small touches that cameramen love to do. I opted for portraying raw nature. We did have to cheat a bit here and there; for example, the wheelhouse of a ship at night doesn't have any lights at all — they would blind the helmsman and ruin his night vision — but in a movie you have to be able to see, so we cheated by adding the glow from instruments or a movie moon. In the trawler with Clooney and his band of fishermen, we cheated the light from down below in the crew's quarters so it would throw a glow up the stairway and provide some light in the wheelhouse. For the most part, though, we went for reality.

"I've taken that approach with a lot of my films, although this was admittedly a new extreme. I love reality lighting. I love the fact that an

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audience can sit through a film and feel comfortable in the security of visual reality. If the story is a horror story, the horror is that much more [effective] because it all looks real. For *The Perfect Storm*, we were going for exactly that [feel]."

In addition to extensive bluescreen work — and perhaps in homage to Seale's low-budget mindset — the production used to a number of "poor man's-process" sequences, using large, painted backdrops in place of the bluescreen behind the gimbaled boat. Four different backdrops (each 60' high x 200' wide) were rigged on an extensive traveler system across the back corner of the stage. The #1 backdrop was painted to emulate bright and happy skies, #2 was the deepening storm, and #3 was what Seale called the height of the "apocalyptic storm." The fourth drop was painted to emulate deep night during the storm, and Seale used several 70K Lightning Strikes units, along with a prototype 40K Lightning Strikes Par, to augment the CG lightning that ILM would add into the painted backdrop.

Peterson, however, refused to classify these sequences as poor-man's process. Laughing, Seale explains, "Considering the expense of putting each of these shots on film, he felt that we had moved into the 'middle-class-process' category, and that's what we called it from then on. ILM even started identifying sequences as 'MC' shots. I think Wolfgang may have invented a new term!"

Setting the Watch

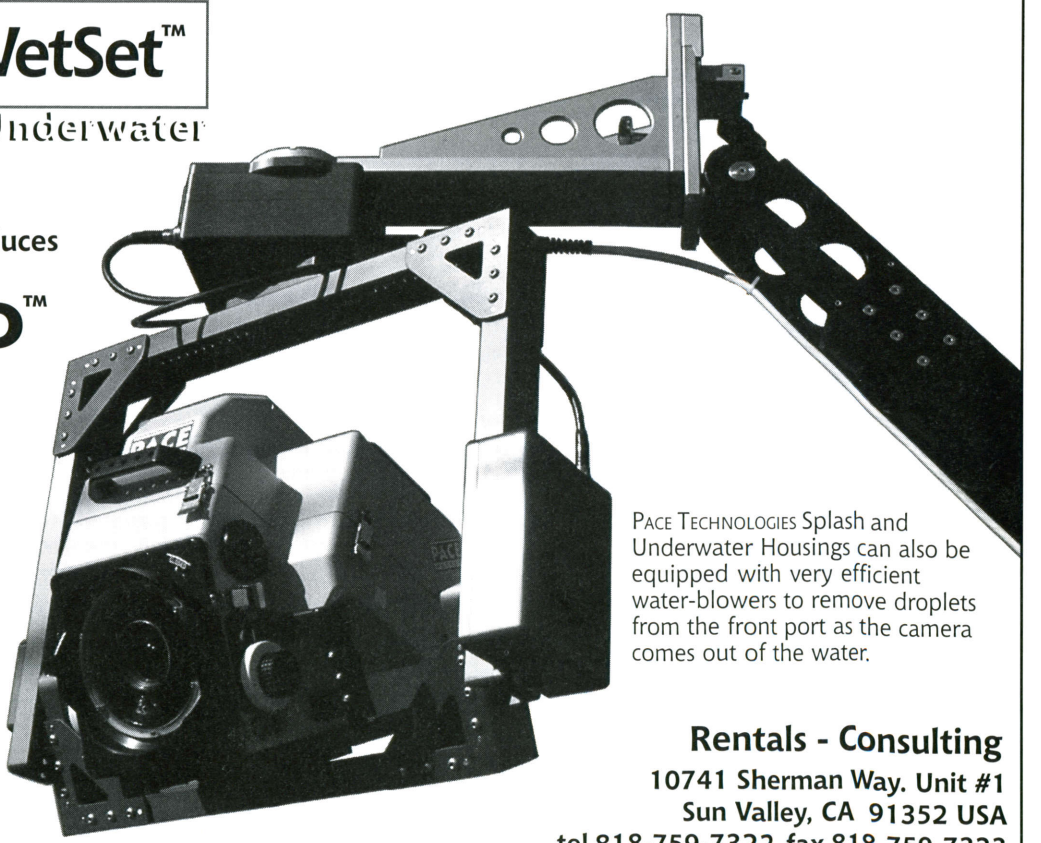
The trendsetters on *The Perfect Storm* utilized every means at their disposal to work efficiently and economically and keep the film's $100 million budget under control. Toward that end, the production kept the soundstages working 24 hours a day. The first unit would work from 7 a.m. to 7 p.m., while the second unit would toil from 7 p.m. to 7 a.m. "Duncan Henderson, being the great producer that he is, decided to keep the stages rolling all day long, and it was a fantastic way to work," Seale submits. "It enabled the second unit to jump onto their shots hand-in-hand with the first unit. They weren't waiting six, seven or eight weeks until the stage was available to come in and pick up their shots; they were shooting right along with us. That also meant that [if we ran across] anything during the day that could be swept over to second unit, they would simply pick it up that night with fresh notes from us. In many cases, they had a hot set to work with.

"That also meant that the editor was getting first- and second-unit dailies at the same time, which enabled him to cut together nearly

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final sequences right off the bat. At the end of our night, we'd turn the stage over to Walt Lloyd and his boys. They would shoot what was on their slate and whatever shots we swept to them during the day, and then rough in our vehicles and lighting so that the first unit would be ready to shoot from the get-go the next morning. We were one well-oiled machine rolling toward that release date!"

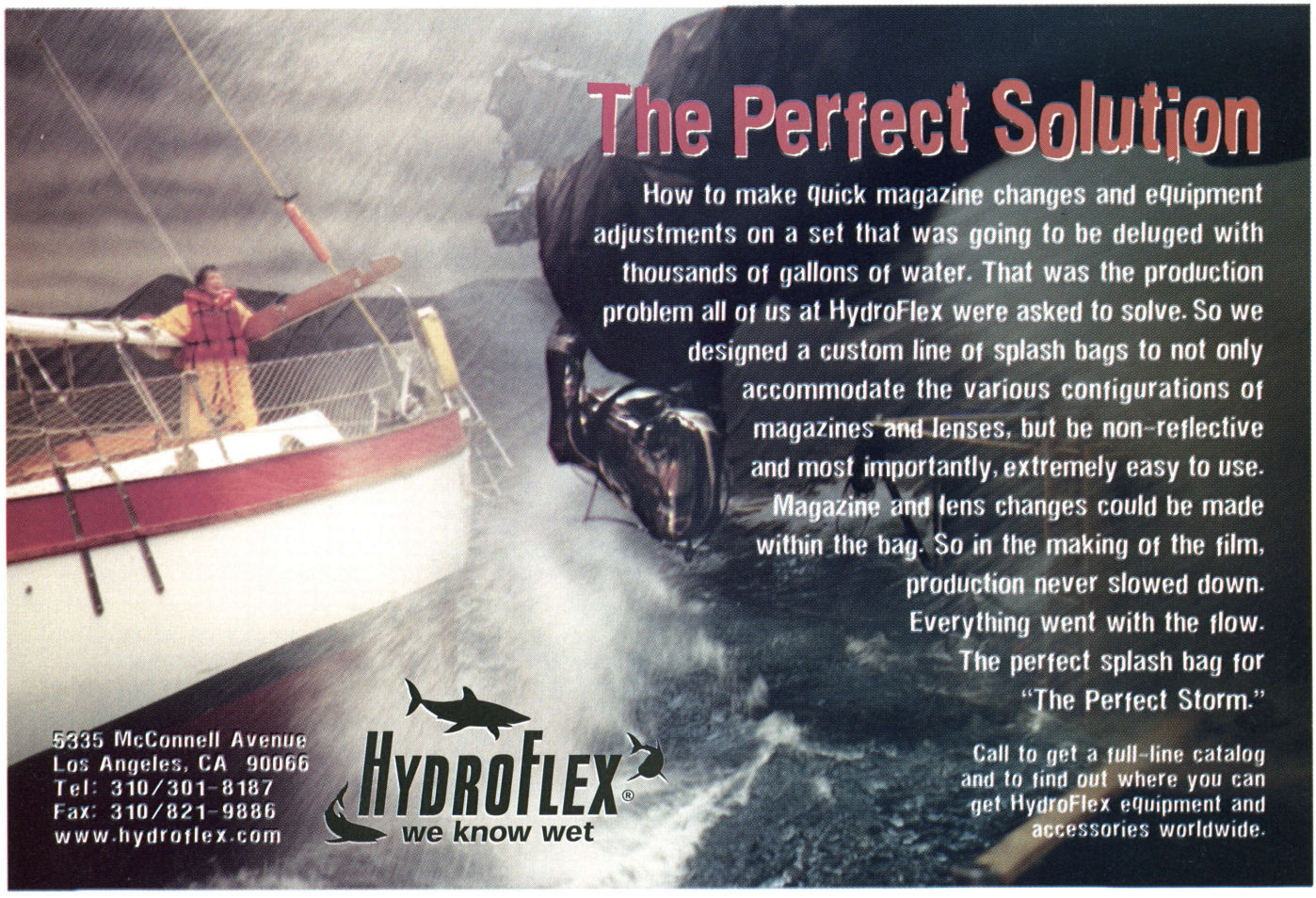
Heading In

The final scene of the film takes place in a cathedral, where a memorial is held for the crew of the *Andrea Gail*. Striving for authenticity, the production chose to shoot on location in Gloucester. A high-ceilinged cathedral with Gothic, stained-lead windows presented Seale with a bit of a challenge. "It was difficult to light because the windows were very thick," he recalls. "We poured as much light through them as we could, but in the end it wasn't enough, and nature didn't allow the sun to be on the right angle to give us any help.

"This was the one location where I wanted a bit of heightened realism. We've gotten out of this horrible storm, and I felt we needed a lift at the end. I wanted to get some shafts of light coming through the stained windows, but the 6Ks and 18Ks that we put up on cherrypickers outside just weren't doing the job. In a slight panic at the last moment, the boys rallied together and we set up a number of 1200-watt Pars inside the church, hiding them behind pillars to give us the beams we were looking for. We also bounced three or four 6K HMIs into a little, angled roof return up near the altar to bring up the overall ambience in the room and create the feeling of some sunlight. I wanted to give the audience a chance to come up for air and breathe a bit before going home."

Seale confesses that he was overcome by a bit of "temporary insanity" at the outset of production. "Like a madman, I insisted rather vehemently that we would get eight to 10 shots per day. Everybody looked at me like I had lost my mind — this, on top of the fact that I wanted to go to Africa and brave the storms! I'm sure many of them thought I was just very sad. But I was insistent, and after a while people said, 'It's a crazy idea, but okay, let's go for it!'

"We never did achieve that goal, and with the complexity of every shot, we never really could have," Seale concludes. "But every shot we did was fantastic, and I truly believe that gigging everybody up at the beginning of production helped to create a wonderful source of energy that we all kept up throughout shooting." ■



Salt of the Sea



Director Wolfgang Petersen returns to the ocean to skipper *The Perfect Storm.*

by Ron Magid

Unit photography by Claudette Barius, SMPSP

Wolfgang Petersen is not one to take the easy way out. During a career filled with technically challenging films, including *The Neverending Story*, *Enemy Mine* and *In the Line of Fire*, the director has consistently set a high-water mark, placing his protagonists at the center of visually stunning cataclysms that test their mettle. But of all his films, he found *The Perfect Storm* to be the most challenging since the classic 1981 World War II submarine thriller *Das Boot*.

Like the fishermen protagonists aboard *The Perfect Storm*'s doomed *Andrea Gail*, Petersen has spent a good amount of time on the water. Whereas most filmmakers do everything they can to avoid making even one film on the ocean, Petersen has now made two. *AC* caught up with Petersen recently to ask him why he's drawn to stories set at sea.

American Cinematographer: What is it that compelled you to work on water again?

Wolfgang Petersen: I couldn't get enough of it, because [*Das Boot*] was so much fun, and I just *love* that element. Also, it gives me an opportunity to watch people very closely in a very close environment — within a U-boat or, in this case, trapped inside 'the perfect storm.' There are many things about the sea that I just love, [along with] all of those big-time writers.

But the Hemingways just had to *write* about the sea…

Petersen: …[and] I have to shoot it! That's the tough part of it, yes! And this one was especially tough.

What drew you to *The Perfect Storm*?

Petersen: When I read the book [by Sebastian Junger], I said, 'Oh, my God! How exciting and unusual it is! Now, how can we do it?' I knew we'd be dealing with water, especially in *extreme* situations, but we'd also have to put this whole *world* together. There was not only the *Andrea Gail*, the fishing boat that

Photos courtesy of Warner Bros.

gets caught in the storm, but also the subplot situations involving Coast Guard ships and rescue helicopters with pararescue jumpers leaping into this raging ocean to save people. What I like about creating the storm of the century is that reality is the headline above everything, just like it was in *Das Boot.*

Cinematographer John Seale [ASC, ACS] is not known for gritty, hard-edged action movies, but for his photography on lush, romantic period pieces such as *The English Patient.* What did you see in his work that convinced you he was right for *The Perfect Storm*?

Petersen: First of all, I loved his passion for another project of mine, *Endurance*, which is a totally physical, outdoorsy, cinematic adventure that will involve re-creating the Antarctic. If you want to do that kind of thing, you have to be very adventurous, and John was almost pursuing me. He was really interested in doing that movie, which impressed me a lot. I've seen most of his movies, and I think he's a great cinematographer, but I was surprised he wanted to do something like *Endurance.* I think it's always a great thing for somebody to throw themselves completely into something they have a passion for, even if they've never done it!

So it was a leap of faith on your part?

Petersen: Yeah, yeah, yeah! But thank God I did it! John's a complete 'outdoors' guy. He loves the water, the sea — he has a sailing boat that he built himself! From *scratch*! I thought, 'What about doing *The Perfect Storm* with him?' And then I heard from his agent that it was his favorite book, and he was just *crazy* about it!

Your films are known for incredibly energetic photography. Did you continue that style on *The Perfect Storm*?

Petersen: I think so. But very often, that kind of special energy comes from the combination of photography *and* editing. This is the second time I worked with Richard Francis Bruce, who is one of the great editors around, and working with John Seale also gave this movie an enormous, feverish energy. John loves to do all kinds of interesting camera movements, and a lot of Steadicam work. The camera was constantly moving.



Opposite page: A 32' sloop is buffeted by man-made wind and waves within Stage 16 at Warner Bros. This page: No stranger to waterborne dramas, Petersen says *The Perfect Storm* was as logistically challenging as his classic 1981 submarine thriller *Das Boot.*

How much of the shoot actually took place on the water, and what kinds of hardships did that cause?

Petersen: We filmed for weeks on the real ocean, on the waters of the Atlantic and the Pacific. The main problem is always seasickness — I had it on *Das Boot,* and I had it here again. I'm from Hamburg in the north of Germany, and I grew up around water, so it was fine in the end. But we were always physically fighting the water. For example, when we were shooting on the East Coast [in September of 1999], Hurricane Floyd hit there, and we were kind of an endangered species. We actually had quite a bit of luck, because this big, big hurricane could have hit Gloucester [Massachusetts], but it didn't. We caught the tail end of it, and we had beautiful, great big waves.

You know what? It doesn't sound like much, but an 8-foot wave is big! It's a lot! So we got great shots, but at a very high price, because half the crew was seasick. I think Mark Wahlberg threw up 35 times. It was just unbelievable!

There are other problems, too, like colors that change all the time. The weather changes often; if you look from one angle over to the other direction, it's a completely different situation.

Did you ever have Industrial Light & Magic come in and do sky replacements to help match location shots?

Petersen: We did that all the time.

Of course, you gain the most control over weather on a soundstage. Was it always your intent to shoot part of the film indoors?

Petersen: You know, we had all kinds of thoughts. [We considered] shooting at a variety of places: the water tank in Malta, the facility in Mexico where *Titanic* was done, and even at the Universal Studios lake. Finally, after struggling and brainstorming for a long time over how to do this movie, we said, 'The best, most efficient thing would be if we built an indoor tank at Warner Bros.' And the studio did it! They dug a 95-

Salt of the Sea



Petersen consults with a crew member and actors Mark Wahlberg and George Clooney on the bow of the movie boat.

by-95-foot square, 22-foot-deep tank into the floor of their biggest stage, the legendary Stage 16. It's the largest inside-a-soundstage tank in the world, but we needed it to be as big as it is because our *Andrea Gail* was 68 feet long.

How did you create the illusion that the *Andrea Gail* was on the high seas?

Petersen: The entire boat was set on a gigantic gimbal in the water. You can imagine what a weight that was! The movement of the boat could be programmed and recorded in a computer, so we could repeat those movements endlessly. That was a great tool. We also had these big, specially built tanks that dumped tons of water over the boat, plus six or eight water cannons [that] were used to shoot water over the boat. The boat was being rocked on the gimbal in combination with wind machines, rain machines and wave machines — what a *spectacle* that was!

Where was the camera?

Petersen: I learned on *Das Boot* that it's very important to never connect the cameras to the boat itself. The cameras have to be independent of the boat to really get the feeling of the movement in the water. We therefore had two, three or four huge crane arms with cameras extending from the edge of the tank, which gave us a third axis of movement. Having the cameras totally away from the boat enhanced the movement of the boat and helped a lot later on to [create the illusion] that the boat was moving through the waves.

Where were you positioned while all of this was going on?

Petersen: We were all sitting in front of a long row of monitors at the back of the stage, watching the images. It looked like a high-tech operation, which was pretty amazing. We had the walkie-talkies and stuff like that, but when I really wanted to talk to the actors, I had to run all the way down to the tank, get into a boat and row over to them!

Sometimes I just stayed on the boat, because it had a real galley and that kind of stuff, but it was so *horrible* to be there. For the actors, it was fine, because they were used to getting smashed with water all the time. But for me, it was uncomfortable to be on the boat, and you got dripping wet in a few seconds! So I mainly stayed away from that and went back on my little boat to the row of monitors.

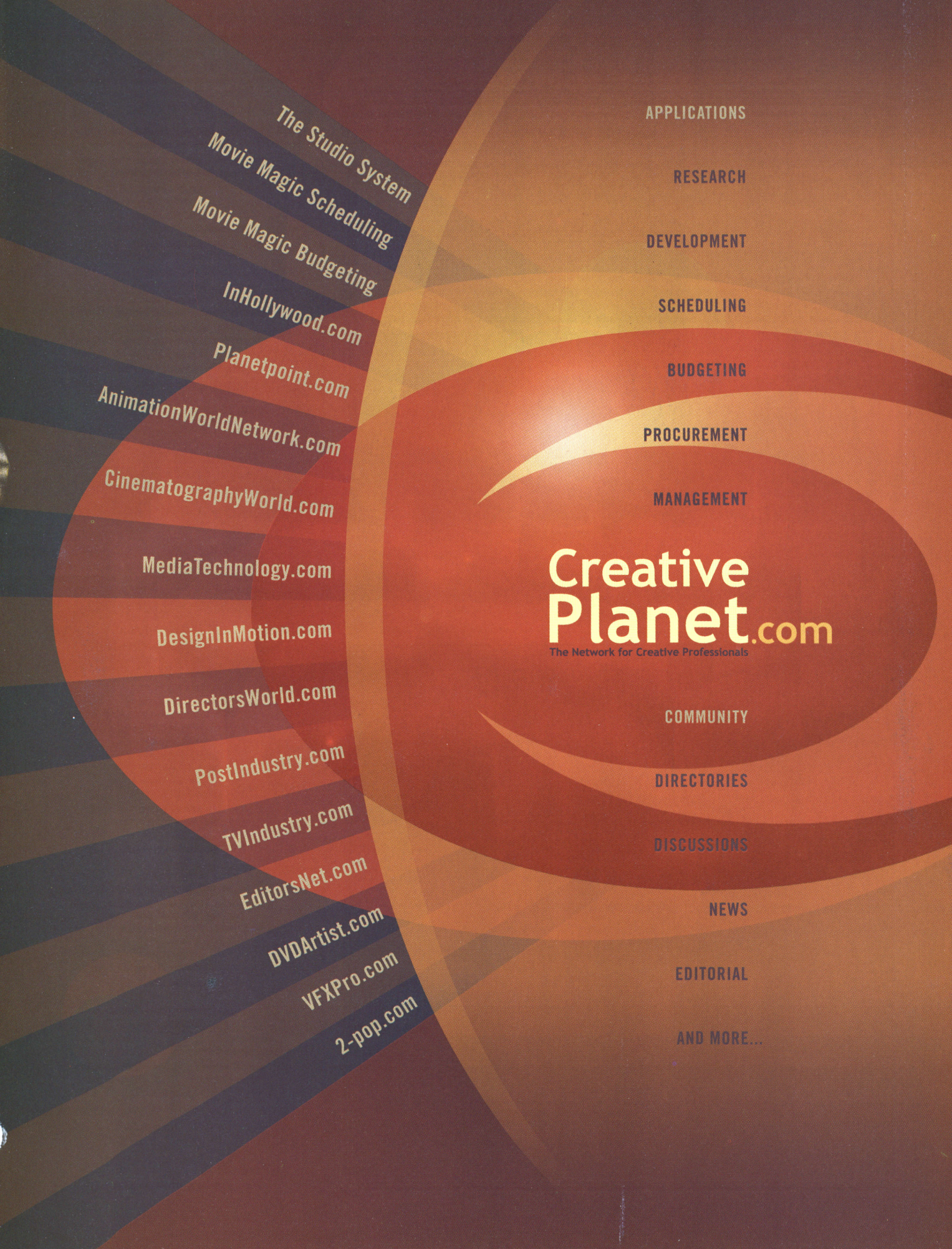
When we shot on the boat itself, we used Steadicam, but that only worked if [the motion of the boat] was not too wild. Once the Steadicam guy falls into the water, that's it!

So if you're simulating the boat climbing up 100-foot waves, it's probably time to abandon the Steadicam?

Petersen: Yes. Steadicam is not possible [in that situation]! The Steadicam operator might start to get uncomfortable at a wave height of 10 feet, so we did more of that footage when we shot on the real sea — but only when it was calm.

Back on stage, how did you plan to incorporate ILM's digital storm backgrounds with your practical boat?

Petersen: The entire stage was surrounded with bluescreens, and


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the rest of the shot was always added later by ILM. Despite all of the water crashing over the boat against bluescreen, ILM can add more water in the foreground and seamlessly blend their computer-generated seascape behind the boat.

Were there times when you took the bluescreens down so you could get in-camera shots of the *Andrea Gail* in the storm without using additional visual effects?

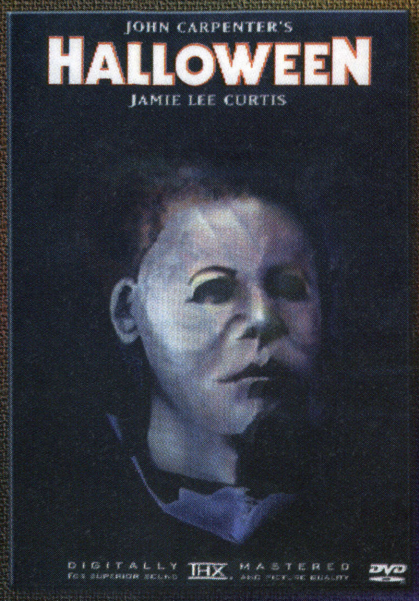
Petersen: Yes. We had a lot of shots in which we were working with good, old-fashioned paintings of 'real' backgrounds. We did all kinds of variations of backings for Storm Phase I, Phase II, Phase III and so on, until [the storm] was just apocalyptic. We had a lot of spray and stuff in front of the paintings, so they looked pretty good. In the past, we would say of this technique, 'We'll do the Poor-Man's Process,' but [this time] we said, 'Our movie is so good, we don't want Poor-Man's Process. Let's call it Middle Class!' We subsequently referred to those takes as 'MC shots.' Maybe that term will get into the filmmaking vocabulary!

Was it a challenge for you as a director to look past the technology?

Petersen: Absolutely, and that's not easy! The big danger is that at the end, you are so overwhelmed by the technical things that you lose sight of what's really important, and that's the people and the story. On the other hand, it's very hard to overwhelm me, because I'm quite experienced with dealing with these kinds of tools. Also, I kept really good control of the movie financially. We ended up about $350,000 *under* budget! Have you ever heard that about a movie dealing with *water*!? I'm *very* proud of that.

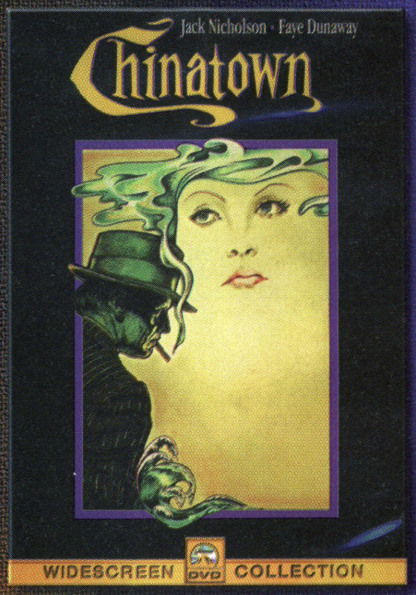
Is *The Perfect Storm* the most technically challenging film you've made?

Petersen: *Das Boot* was truly challenging, but this project was also extremely challenging and satisfying. *The Perfect Storm* is probably the film that I'm the proudest of. ■

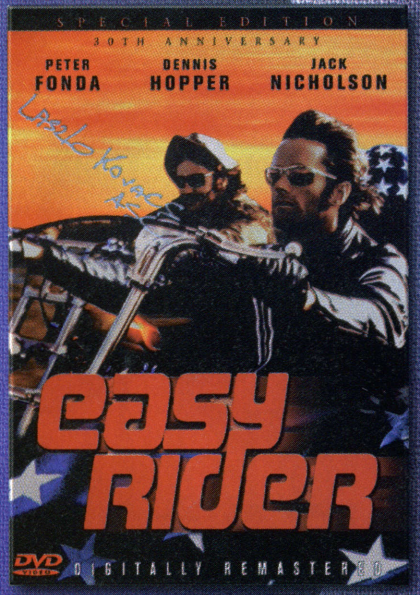


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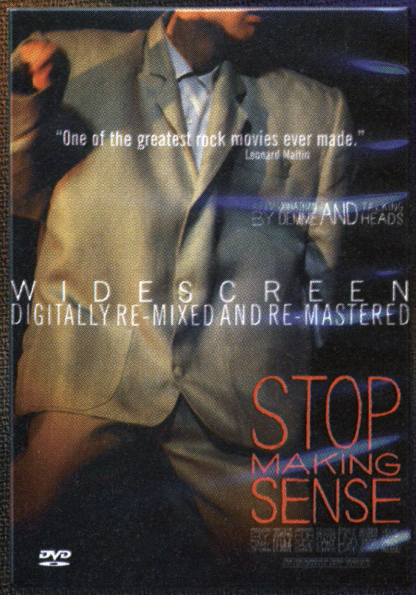




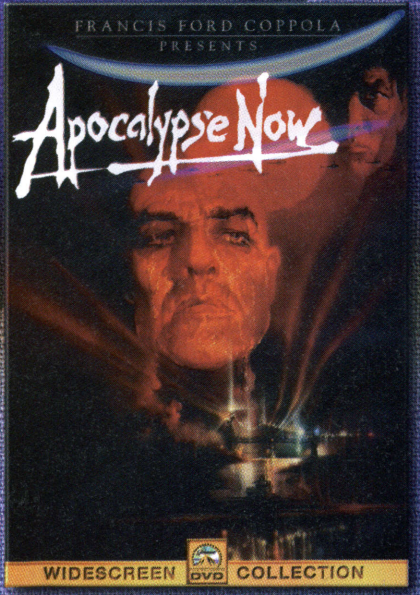
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Unleashing An Inner Child

Cinematographer Peter Menzies, Jr., ACS adds atmosphere to a key sequence in Disney's *The Kid*, in which a middle-age man attempts to recapture his youthful dreams.

by David Weiner

Photography by Frank Masi, SMPSP

In *The Kid*, Russ Duritz (Bruce Willis) is a fortyish image consultant with a professional life in the fast lane and a personal life that's going nowhere. He knows there must be some reason he's so lonely, but he just can't figure it out. Then, magically, he meets himself as an 8-year-old — pudgy little "Rusty" (Spencer Breslin) — and gets the chance to become the grown-up he always wanted to be.

Australian cinematographer Peter Menzies, Jr., ACS was brought onto *The Kid* by producer Hunt Lowry, with whom he had worked on *A Time To Kill*. (Menzies's other credits include *The General's Daughter*, *Die Hard With a Vengeance*, *The 13th Warrior*, *The Getaway* and *Hard Rain*.) "We had a great rapport, and we'd been trying to hook up on other things since then," Menzies recalls. Lowry introduced the cameraman to Jon Turteltaub, director of *The Kid*, and Menzies read and loved the script. "I thought it was a bit like *It's A Wonderful Life*," says Menzies. "It's a fantasy and a fairy tale, but it's set in

Photos courtesy of Walt Disney Pictures.

reality. When Hunt and Jon approached me, they said they wanted an edgy, real look, [and that] intrigued me."

One scene in particular posed special challenges for Menzies and his gaffer, Rafael Sanchez: an exterior airport sequence that takes place in the dead of night, about a third of the way into the movie. "This scene takes place just after Russ catches Rusty in his house," Menzies details. "Rusty escapes, and Russ chases him; the kid is on a bicycle and Russ is in his car. [When] they get to the airport, the kid dumps his bike and takes off on foot, and Russ jumps out of his car and chases him through some airplanes outside a hangar building [see "Krueger Hangar" diagram, page 72], then onto the runway. The chase finally ends outside a little airport diner [see "American Flyers" diagram, page 72]. A small part of the airport stuff will show up at the end of the movie, but most of it is the chase that ends at the diner."

The scene was filmed at Santa Monica Airport, which was in use during the entire shoot. The diagrams represent two areas of the airport that are separated by about 350 yards. In the film, the actors will appear to leave one area and immediately run into the other, as if Krueger Hangar and American Flyers are located next to each other. The airport scenes required five nights of shooting and take up about eight minutes on screen.

"Jon Turteltaub and I didn't want it to look like a plain, boring airport, because what happens there is pretty special in the story," Menzies says. "We wanted the whole environment to have a great illumination; we wanted to make it magical in its look, even though the sequence is not a fantasy. We lit up all the planes because Jon wanted them to glow inside and out. There were more planes on the field than you see in the diagrams, and every one of them was lit. I love contrast and lots of depth."



Opposite page: Young Rusty (Spencer Breslin) helps his older self, Russ (Bruce Willis), regain his zest for life. This page, top and bottom: Cinematographer Peter Menzies, Jr., ACS faced the challenge of illuminating the Santa Monica Airport for one of the film's key sequences.

Two 500-watt tungsten fixtures were set on the ground in front of each plane and aimed upward. "We photographed those lights [instead of] hiding them," Sanchez recalls. "The inside of each plane was also lit up with 2-foot Kino Flo tubes balanced for tungsten. We wanted a low heat-emitting lamp inside the planes, just to lend a glow to the interior and show the windows."

The two large, open areas required a forest of rigging, lighting stands, fixtures and custom-designed practicals. "We always arrived a bit before sundown," Sanchez says. "We'd plot out the shots and give ourselves prep time while it was still light. We prepared each area separately; the American Flyers area took about three days to rig, and Krueger Hangar took about two days. Gary Dahlquist, our rigging gaffer, is fabulous. He and Bob Leitelt, the rigging grip, and the rest of the crew dealt with hiding cables all over the place, and Peter [Menzies] and I never had to worry about it. Our key grip, Alan Rawlins, and his crew were super."

Menzies notes he had worked with the same crew on *The General's Daughter*. "They were just amazing," he says. "On *The General's Daughter*, [they were] going into swamps and things. Once they had everything ready, we started with [the American Flyers sequence]."

A few tests were made before filming got underway to determine



Unleashing An Inner Child



Right: A huge softbox filled with 84 1K nook lights was suspended over the airport diner, creating a wash of highly diffused light. Below: Russ weaves through an array of backlit planes as he hunts for Rusty.

the right color temperature for alternating gels on a Syncrolite, a 7K Xenon with programmable motion control. (The Syncrolite appears on the right side of the Krueger Hangar diagram and on the left side of the American Flyers diagram.) "The Syncrolite simulated a real airport night-beacon," Sanchez says. "It can be programmed with a computer disk to pan, tilt, spot or flood. It has the same fluidity of an airport beacon; you get the feeling of it automatically sweeping back and forth over the scene."

Menzies and his crew took some creative license with the Federal Aviation Administration's color standards, however. "I'm told the lights on real airport beacons are supposed to be green and white," Menzies says, "but that looked a bit boring, so we made them blue and red. Along with the movement [of the light], we could program color changes, so we had this giant, automated 7K Xenon swinging around and alternating gels. On one pass it was blue, then it would change to red and do the next pass."

The problem of lighting large night exteriors is usually solved by elevating powerful lights high above the scene on cranes, lifts or scaffolding. Unfortunately, a working airport won't allow this because it creates a safety hazard. "We couldn't do the usual thing, [such as] putting a big light on a Condor, taking it 100 feet up into the air and lighting the whole area," Sanchez notes.

Instead, Menzies's crew set up lighting towers all over the airport, which provided general illumination as well as plenty of backlight. Menzies and Sanchez had the art department design special steel towers, which are labeled "4 220V 1500W Broads On Light Tree" in both diagrams. More than a dozen were constructed, ranging from 15' to 30' high — low enough to avoid interfering with airport operations. The towers would be clearly visible in most shots, so they had to look like airport lights.

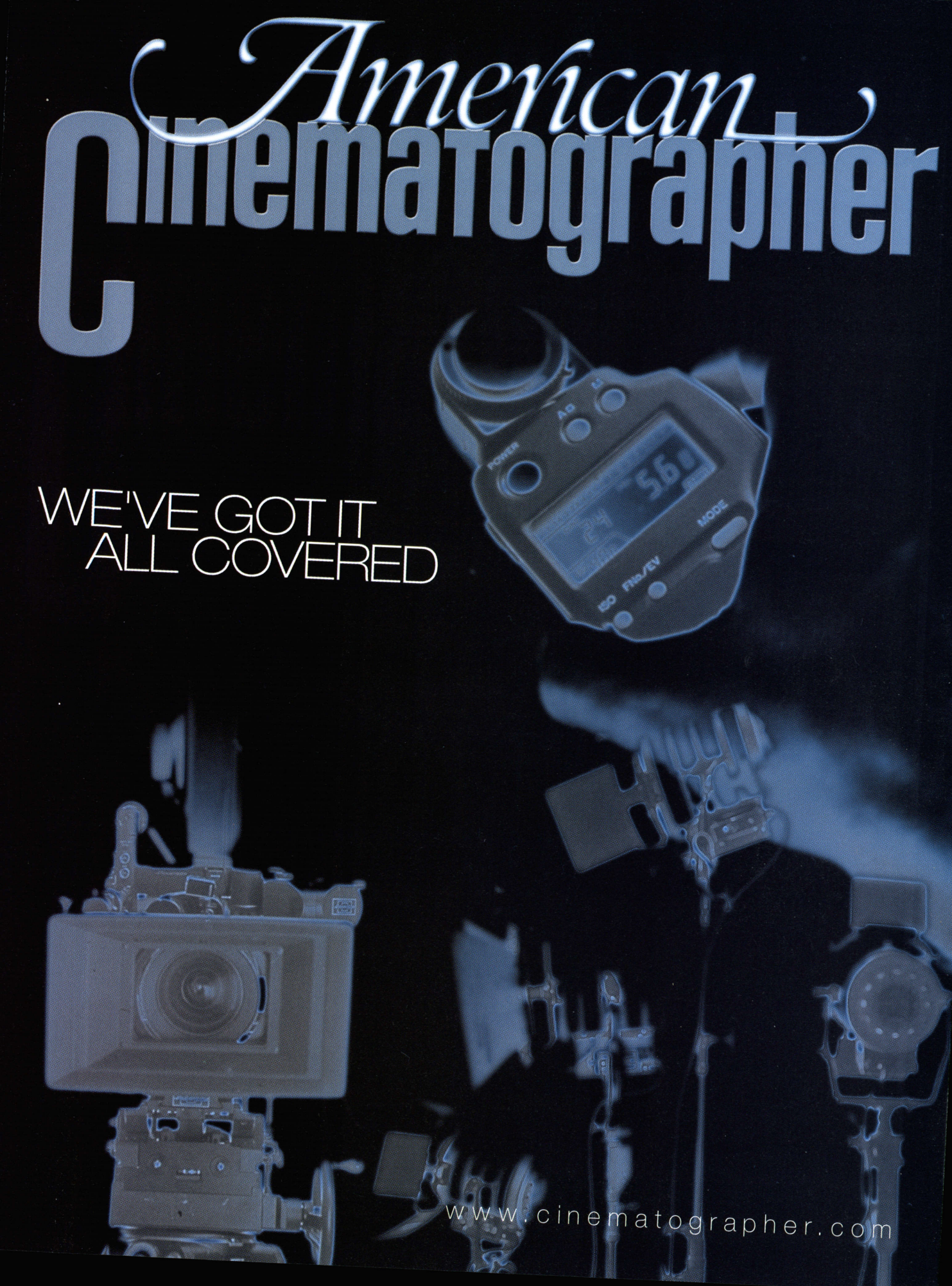
"As we got closer to the runway," Sanchez explains, "we had to use the shorter towers because height restrictions get lower and lower [as you approach the runway]. Each tower had four 1500-watt, 220-volt security lights, all on dimmers. They really were industrial, not movie lights at all. We put a warm hard gel, ½ CTO, on the two upper lights, and the bottom two were left as plain, white quartz. That gave us a little color, and as we dimmed a light tower, the color temperature changed and became just a bit warmer, which created more contrast. Peter loved that.

"The ground was soaked down all through the filming to pick up kicks and reflections from the towers," he adds. "A lot of thought went into the design for this set [in terms of] the practicals. When we got there, we could move quickly with just a few units on the ground."

Menzies concurs, "Wetting down the ground gave us twice as many highlights. When you see a light tower, you see four points of light from the four lamps, and you also see another four points in the water."

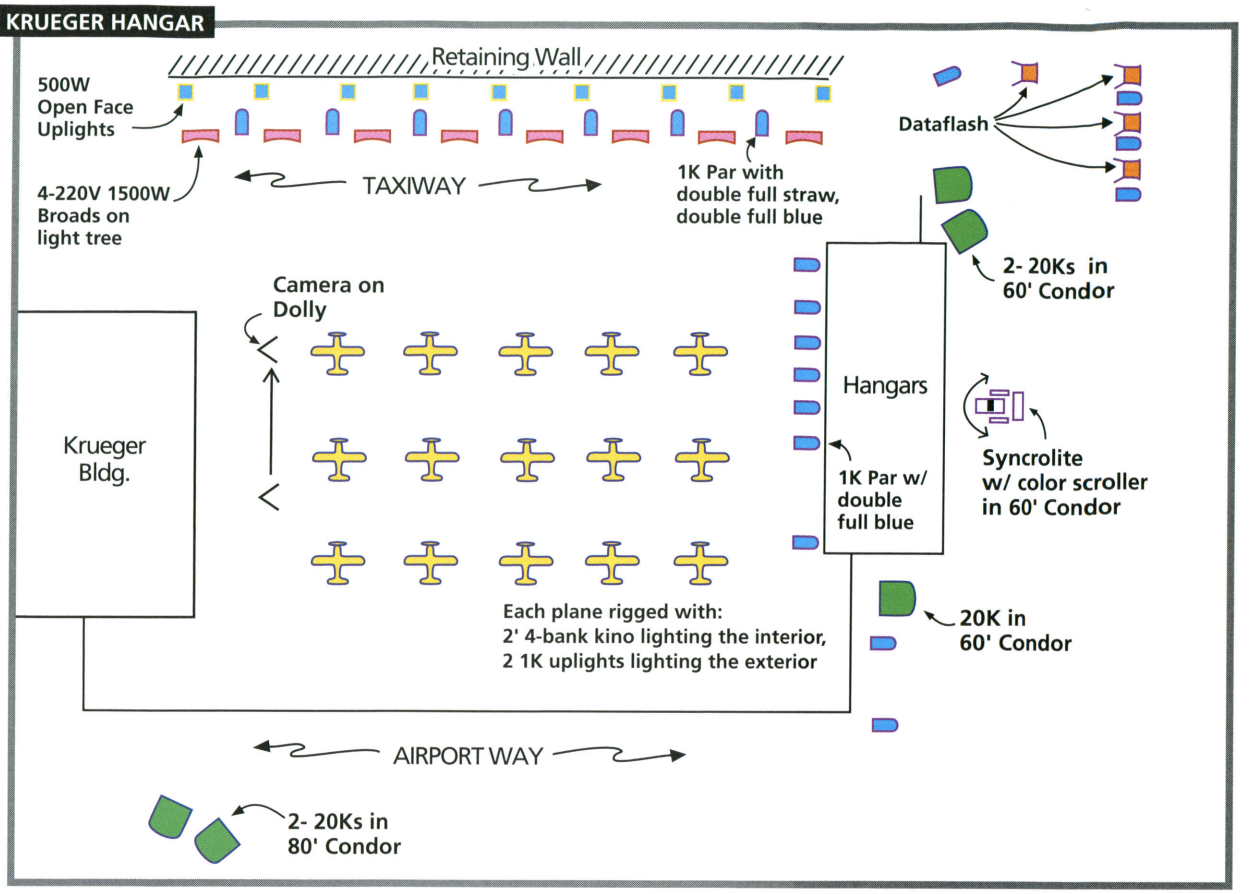
According to Sanchez, lighting the runway (Krueger Hangar, top




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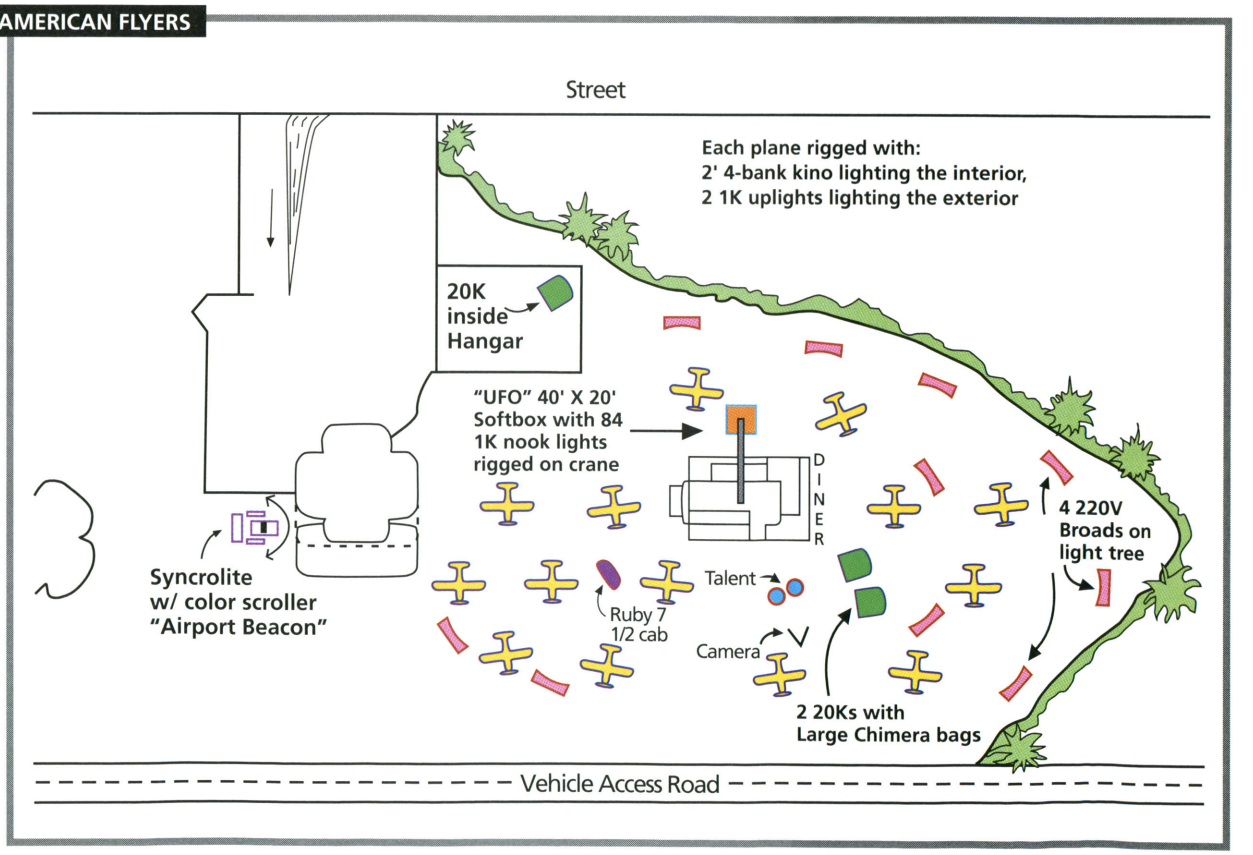
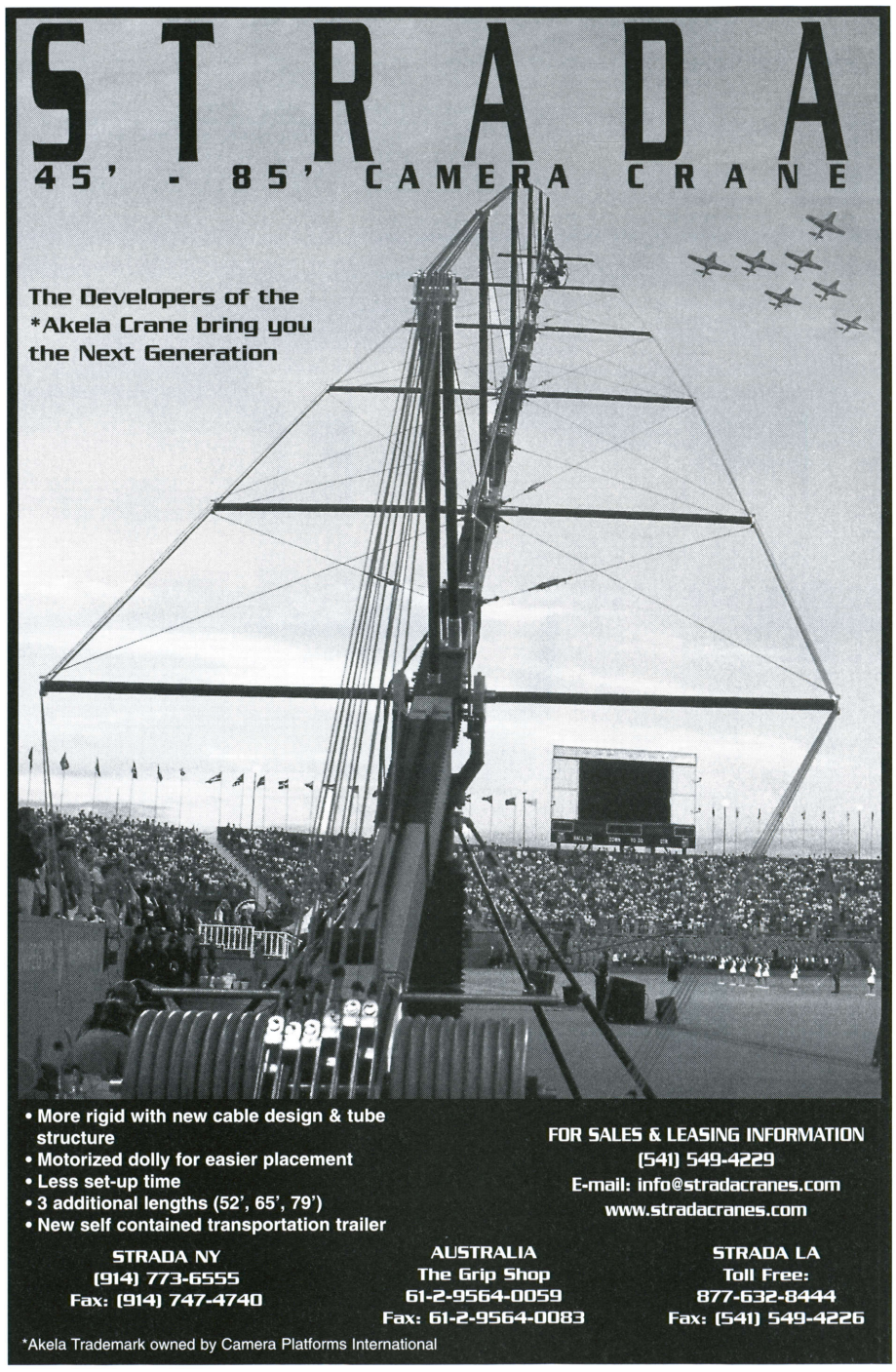


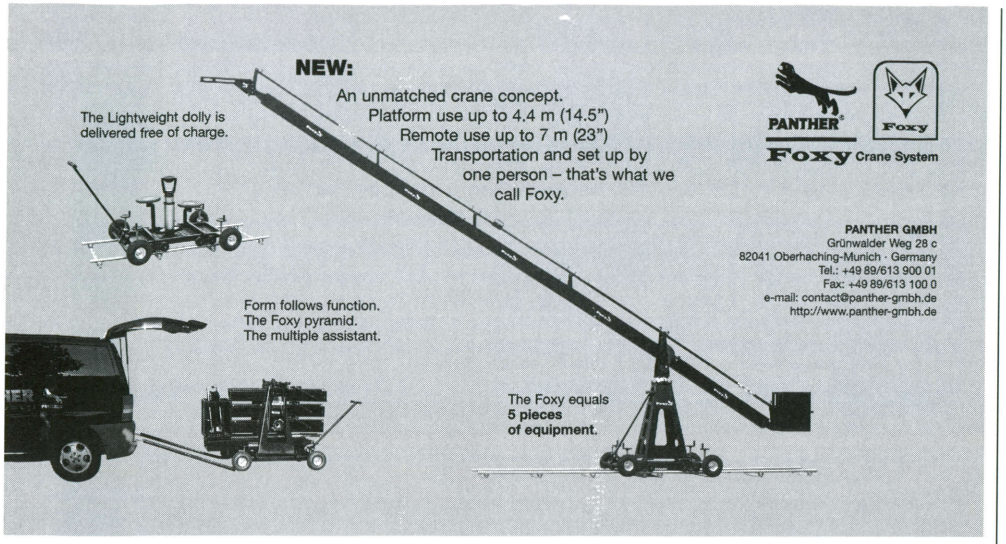
diagram) without jeopardizing the airport's operations was a real problem. "We weren't allowed to throw big lights on it for safety reasons, so we took 24 Par cans, put each one on a five-foot stand, and lined them up along the far side of the runway. These are very directional lights, and you can only see them if you're looking right into them. We had them gelled with double full blue and double full straw, so when we looked across the runway, we'd see a row of lights — blue, blue, blue, yellow, yellow, yellow. That gave depth as we panned across and caught a glimpse of the far side of the runway. Because they're so directional, they didn't distract the pilots or conflict with the official lighting." (A similar line of Par cans with double full blue gels was set up along the hangars, as seen on the right side of the Krueger Hangar diagram.)

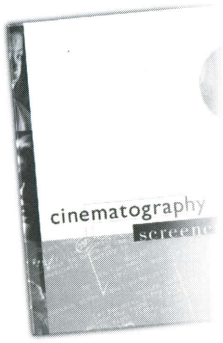
"Just behind the pops of blue and warm light along the runway, there was a retaining wall [Krueger Hangar, top]," Menzies says. "We used 500-watt units to light that wall, the same ones we used for the airplanes. We couldn't throw any light on the runway, so we just pointed them up at the wall to get depth without causing problems for the pilots."

The diner where the chase ends was created just for *The Kid*. A classic 1960s American diner, it was prefabricated at the studio, then hauled out to Santa Monica Airport and reassembled on site. After the airport scenes were completed, it was brought back to Stage 22 at Warner Bros. for interior scenes with Russ and Rusty. "Once we were back in the studio doing the diner interiors, we had to mimic the lighting from the airport," Menzies says. "The main thing was to imitate the Syncrolite's airport-beacon effect. We used a 4K Syncrolite in the studio and raised it on a Condor, which gave us the sweeping, blue-and-red beacon effect coming through the windows









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by Peter Ettedgui

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of the diner. We also had one or two planes brought onto the stage, so when you looked out the diner windows, you'd catch sight of a plane. We took some of the smaller light towers onto the stage as well, and we used smoke to lightly diffuse the background."

At the airport, a huge softbox filled with 84 1K nook lights was suspended over the diner from a crane, pouring down highly diffused light. (This is represented by the thick black line ending in a cross-hatched box extending from the diner on American Flyers). "[The softbox] was hung off of a UFO crane," Sanchez details. "It's nothing like the light towers and doesn't appear in the frame at any time."

Menzies elaborates, "We stretched a diffusion cloth across the bottom to create a soft, ambient light above the diner and give it a kind of aura. The exterior surface of the diner was silver, which really made it stand out. A nook light is about 8" by 1" in diameter, so this box was huge, about 40' by 20'. You could point it straight down or angle it to backlight the diner and the actors. The sides and top were wrapped in black to prevent spill [mainly for safety reasons]."

A Ruby 7 (at center of American Flyers diagram) provided crosslight for the diner. The light has seven 1,000-watt, sealed-beam globe lamps, six in a circle and one in the center. Menzies placed eggcrates around the lamps to make them more directional. "We also had two pieces of tempered glass made, one slightly sandblasted and the other quite heavily sandblasted, so we could choose between light and heavy diffusion," says the cinematographer. "These diffusers slid right onto the light, so we didn't need frames or light boxes. A Ruby 7 is incredibly bright but compact, easy to move around and hide. We used one to kick on the front of the diner [with ½ CTB to give the silver a touch of blue], and we could put one

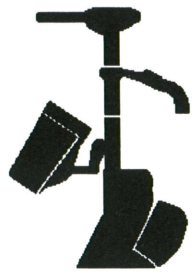
100 yards in the background. We just left it in the shot and aimed it right at us. It's just one more light we put onscreen, and like the towers, it looks like some kind of practical."

Although there were a number of crane, Steadicam and dolly shots covering the chase action, all of the lights remained stationary. "There was a lot of movement carrying the actors into the airport, and a dolly shot as they ran between the planes [at left in Krueger Hangar diagram]," Menzies says. "That was a 60- to 80-foot dolly move, tracking Russ through the planes as he looks for Rusty. But we never used a camera light or anything like that; the actors could just walk out of one pool of light and into another."

At one point in the sequence, a taxiing airplane almost hits Russ. Four Dataflash (1,000-watt, blue Xenon strobe lights) were placed in the background of this shot (Krueger Hangar, upper right). "They lent an intensity to [the shot], providing something extra," Sanchez says. "There were also two 20Ks on a 60-foot Condor lift [Krueger Hangar diagram, just left of the Dataflash] providing backlight. We could do that because this area was a bit farther away from the runway, and we were allowed more height."

According to Sanchez, two 20Ks on an 80' Condor were used to provide backlight when Russ and Rusty arrived at the airport (Krueger Hangar diagram, bottom left), and a 10K on the airport grounds (not shown on lighting plot) provided crosslight for Russ as he got out of his car and for Rusty as he clambered off his bike. The crew also used another 10K nearby for fill, and 20Ks provided almost all of the key light for the actors. "We put diffusion on the 20Ks, Chimera bags that fit right onto the lights," Menzies details. "With all of the light towers, illuminated planes and everything else, we were pretty well-lit wherever we looked as far as backgrounds went.

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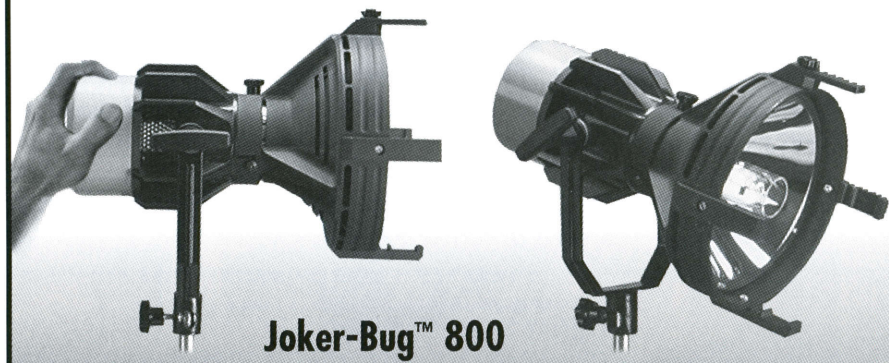
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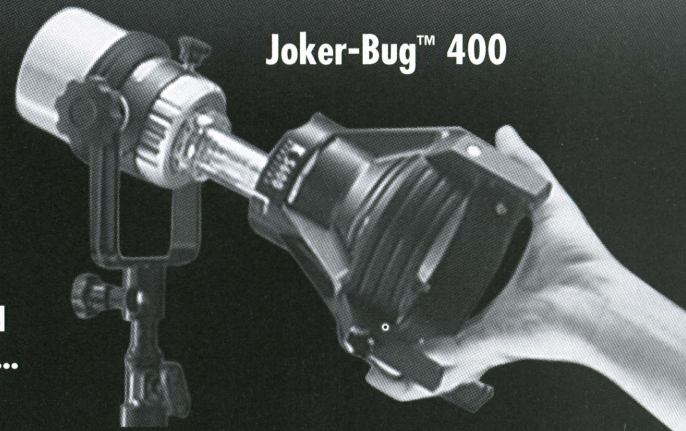
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We'd turn off the light towers if they were behind the camera so they wouldn't contaminate the light on the actors. For fill, I kept things fairly contrasty; I let the key wrap around their faces and just fall off to black, which gave a modeled look. For close-ups, we usually used a 5K covered by a Chimera bag, but occasionally we'd use two 20Ks about 25 feet away; the light hit the actors and dropped off slowly. Sometimes we'd use white boards for a touch of fill."

Sanchez adds, "We also put a 20K inside a hangar [American Flyers diagram, center left]. The hangar door was open, and we used that 20K to light the rear wall to give some depth in the background. It was gelled with ½ blue to provide a bit of coolness. Pete likes to throw some blue in the background to break up the monotony."

Sensitive film had to be used for the night work, and Menzies relied upon Kodak Vision 500T (5279), balanced for tungsten. The camera package consisted of two Panavision Platinums, a lightweight body for Steadicam and Panavision Primo lenses. "This was actually the first film I shot in the 1.85:1 format," Menzies notes. "I've done eight anamorphic pictures and one in Super 35, and the director was quite surprised when I suggested 1.85:1, because he was convinced I was going to push for anamorphic. But it's right for this movie; we needed to carry more depth, and shooting spherical also gave me another stop for filming some available-light shots."

The light on Russ changes temperature slowly and almost imperceptibly as the story progresses. At the beginning of the film, he's detached and lonely, and is lit toward the blue end of the spectrum; as his character develops, he gets a bit warmer. "That was done with a ¼ or ½ CTS, just a slight orange-red gel on the lights," Menzies says, adding that he used no filtration on the show.

"Other than a little bit of greenscreen at the very end of the movie, the only effect is a plane take-off that was supposed to happen at night but was shot at magic hour," he notes. "We're putting that through a computer to play with the color of the sky and make it darker.

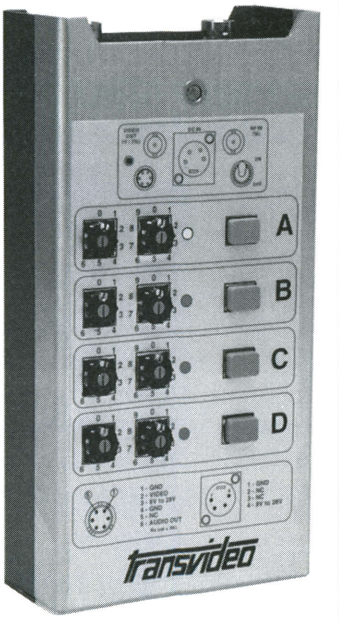
"Things that were under our control went smoothly," he concludes, "but we did get hit with our share of weather on this show. When we started shooting at the airport, it got foggier and foggier until it actually shut us down, and we had to go back to the stage and shoot other scenes. We always had sets that could be used as weather cover. [Thanks to] an amazing crew, we were able to adapt and still stay on schedule." ■

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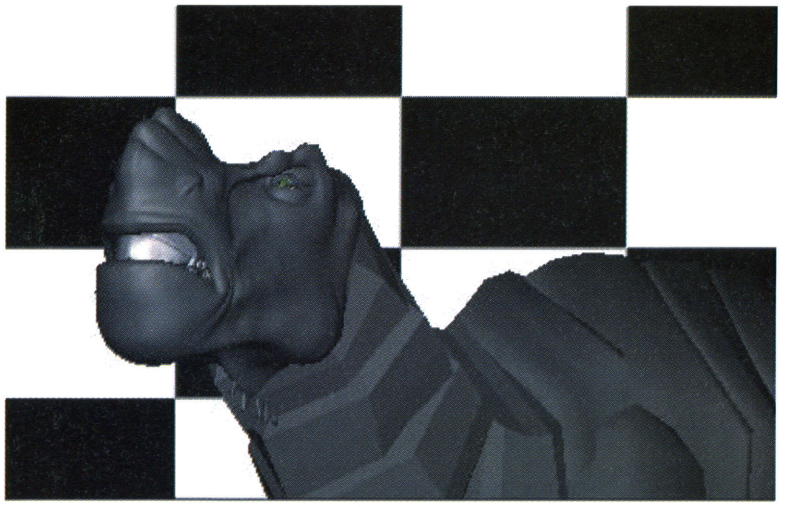


Page design by Edwin Alpanian

Giant Steps

Disney's ambitious *Dinosaur* blends live-action photography with computer-generated creatures to create a visually spectacular, prehistoric adventure.

by Ron Magid





Walt Disney Pictures' startlingly realistic *Dinosaur*, which combines synthetic backgrounds originated from real photography with CG dinosaurs, is arguably the first new kind of animated film since Pixar introduced wholly 3-D computer-animated movies with *Luxo Jr.* back in 1986. Traditional visual-effects films combine CG characters with live-action backgrounds all the time, but it's usually for a few hundred shots; *Dinosaur* has 1,300 such shots. This unique blend of CG characters, visual effects and photographic backgrounds is used to tell the tale of an Iguanodon named Aladar, his love, Neera, and their lemur friends as they try to save a herd from the voracious, horned Carnotaurs. The film may well herald a new cinematic art form.

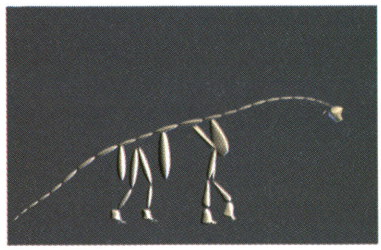
The road to *Dinosaur* was a lengthy one. Back in 1988, fresh off *Robocop* and *Total Recall*, director Paul Verhoeven planned to re-team with animation maestro Phil Tippett to make a highly realistic film whose sole characters would be stop-motion-animated dinosaurs and lemurs, but the plug was pulled when costs soared. The abandoned project sat on the shelf until 1994, when the powers-that-be at Disney Feature Animation realized they had something that could potentially capitalize

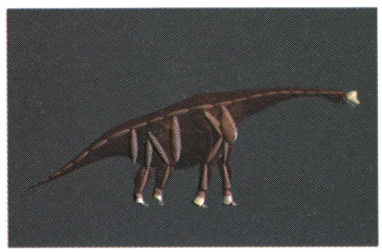
Photos courtesy of Walt Disney Pictures.

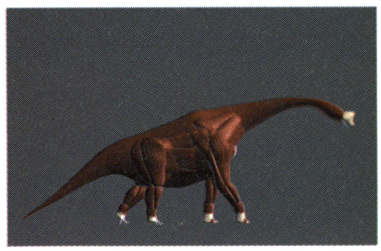
on the phenomenal success of *Jurassic Park*, which had devoured competition at the box office the year before. Suddenly, stop-motion was out, CG was in, and so were co-directors Eric Leighton (who was originally attached to the project as animation supervisor under Tippett) and Ralph Zondag and producer Pam Marsden. The trio spearheaded a skeleton crew through a test to determine whether *Dinosaur* would evolve or be consigned to the ages. "The question was, 'Could we create and animate CG dinosaurs that could carry a movie? Could they be 'actors,' and would audiences bond with them?'" Marsden recalls. "That was a long time ago in the 'Technology Age'!"

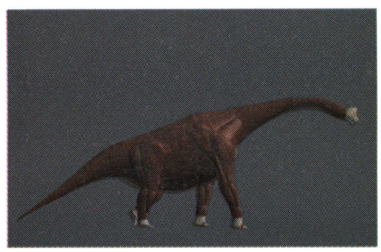
Both Marsden and Leighton were fish out of water in *Dinosaur*'s digital arena: Marsden's background was in theater (she spent 10 years as managing director of the International Theatre Festival of Chicago), while Leighton had served as animation supervisor on *The Nightmare Before Christmas*. Zondag, a veteran animator (*The Land Before Time*), storyman (*Pocahontas*) and director (*We're Back: A Dinosaur's Tale*), had a resume rife with prehistoric characters. "I think there was a bit of typecasting going on," he quips. Surprisingly, the group's lack of familiarity with digital filmmaking was deemed a plus. "The concern was that we all had talent in storytelling, animation and performance first, and then we could train on the computer," Leighton recalls. "[It was the] same with the artists we hired. This offered all of us a great learning experience, which made things much more energized. If you're going into the same old routine, you're not necessarily putting in that extra effort that you would if you're jumping off a cliff into a different world."

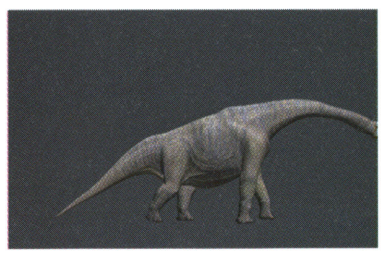
And jump they did. The test was budgeted for six months, but it took a bit longer to prove that digital











dinosaurs could be engaging characters — 18 months, to be exact. "It also became about attracting a crew, developing a story and starting something bigger," Marsden says. Although the test successfully blended CG creatures, a miniature landscape and real skies overhead, Zondag, Leighton and Marsden realized that it also raised some serious issues, like how best to tell a story that was quickly becoming epic in scope and ambitious in characterization. Somehow, the dinosaurs had to be able to express themselves. "We did another test, [this one] in which we could only hear the characters' thoughts, but we just couldn't get a sense of the characters, and we wanted to simplify the story," Zondag says. "Then we saw *Babe*, which had talking animal characters you could identify with, and we realized we had to go to talking dinosaurs."

As *Dinosaur*'s 3-D modelers began reworking the shapes of the lead dinosaurs' faces, giving them lips that could form words and make expressions, the directors and producer were tackling an even more earth-shattering challenge: designing the primeval world itself. "We started with miniature backgrounds, because at the time, we didn't think we could make believable CG backgrounds," Marsden says. "After the test, we realized we had to chuck the miniature-set idea due to its scale. In order to make believable sets for CG dinosaurs that were 30 feet long and 15 feet high, the scale of even a miniature was *huge*, and we would have needed a *huge* facility to shoot them."

In fact, miniature maestro Bob Spurlock designed a state-of-the-art, motion-control "dream facility," featuring a dozen stages with 60' ceilings and central rigs to move the cameras above the sets, but it was destined to remain on the drawing board. "The miniatures were nice-looking, but they didn't satisfy the look of the picture," Zondag says. "I was fascinated by the idea of combining live-action backgrounds with CG dinosaurs, and we did a test."

That test demonstrated that the CG dinosaurs were not ready for their close-ups — at least not in a film where photographic reality was the goal. "The development work that had been done earlier was much more painterly," Leighton remembers. "This goes back to using miniature sets, where the thought was that

Opposite page: A rough animatic of the obstinate Bruton (voiced by Peter Siragusa) is contrasted with the final, highly detailed rendering of the character. This page: Range-of-motion studies were done for each of the dinosaurs to determine how much certain muscles would bulge or how much the skin would jiggle when an animal stopped quickly.

Giant Steps









A live-action plate before and after the addition of Iguanadons and a flying pteranodon, which swoops down and picks up one of the herd's eggs with its beak.

we should be more stylized, so we actually backed off a bit on detail and put 'digital filters' on the characters to give them a more painterly feel. When we went to live-action backgrounds, we realized the whole world would have to be *affected* in order to tie everything together into a reality that had not been seen before."

But what would that world look like? "My idea was to try to make it look like *National Geographic*, with a personality of its own," Zondag says. Adds Leighton: "We tried to create a different world, an older, primal world. The photorealistic aspect really upped the power of the dinosaurs we chose as our characters." Zondag concludes, "But this created immense optical challenges to deal with in the landscape, so the characters would feel integrated into that world."

Translation: Leighton and Zondag weren't looking to shoot any old background plates. Rather, they wanted backgrounds that were alive, that would interact realistically — almost like another character — with their digital dinos. This animated film suddenly needed a visual-effects supervisor and a digital-effects supervisor. Enter Neil Krepela, ASC and Neil Eskuri. "Neil Krepela was our optical representative, and he worked closely with Neil Eskuri, our digital representative," Marsden says.

For the next four years, "the two Neils," as they came to be called, often felt joined at the hip. Their backgrounds were rather dissimilar. Krepela's was primarily photographic, involving the shooting of high-speed miniatures on films such as *Cliffhanger* and *True Lies* at the late Boss Film. There, he also shot background plates for some of the earliest CG characters — the penguins in *Batman Returns* — which whetted his appetite for high-end digital effects. Krepela notes, "I began to think that traditional effects were kind of the exclamation point, but that doing CG character work was like working on the sentence itself. I found that a lot more interesting."

Eskuri, on the other hand, had a background as a CG animator, most recently on *Fantasia 2000*. "I've been doing this type of work for about 18 years," he says. "After I finished my stint on *Fantasia*, I began consulting on software for *Dinosaur*, figuring out what we needed to buy or write. About a month after I started, [when] the decision was made to go with photographic backgrounds, I suddenly got more involved, because we had to figure out how we were going to do it."

Meanwhile, Krepela was defining just what it meant to be visual-effects supervisor on an animated film. "It's animated, but it's all about effects," Krepela realized. Suddenly, he found himself on the other side of an old argument. "They wanted to shoot *everything* on location, and I immediately said, 'Wait a minute! We have to shoot *some* miniatures!'"

To determine what would be shot practically on location or in miniature, Zondag and Leighton had every sequence storyboarded, with Zondag doing many of the boards himself. Location scouts were dispatched to try to find real-world topography that matched the directors' artistic vision. Once the locations were chosen, surveys were done via laser-mapping and global-positioning devices to precisely digitize the geography within 3-D Workbook. To help plot out the tale's often elaborate camera moves, the directors had animatics created that depicted primitive versions of the characters gliding across these digital landscapes. The camera moves were then replicated on location using digital data from 3-D Workbook. "There were always nickel-and-dime issues, but the plates matched the virtual sets in 95 percent of the cases," Leighton says. "Ralph and I used Workbook animatics to predefine the cutting from a cinematographic point of view. I then worked with my animators to define the movements of all our critters — whether a *Dinosaur* was walking at three feet per second or running at 45 feet per second — and fed all of that information into Workbook.

"We first made the animation look good visually, then modified the virtual set if necessary. If there was an elaborate camera move, we would make sure that we were very clear about what was critical and what was



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Giant Steps







Moving action plates were created with the "Dinocam" system, a cable-mounted, computerized camera rig that could rise and fall 70' to simulate the soaring perspectives of prehistoric flying creatures. The rig allowed the camera to glide over broad Cretaceous vistas filled with gargantuan digital herds, or to create fast-paced moves whizzing overhead for chase sequences.

not with the plate-shooting crews, who would put all of their efforts into matching exactly what we did in the Workbook."

Laying out each shot in advance in Workbook made the background plates, practical effects and digital character animation feel integrated almost from the beginning. "3-D Workbook gave me all the facts we needed on location to do the plate, and gave the directors everything they needed for each scene," Krepela notes. "We used it to lay out where the light would be coming from, how high or low to the ground the camera would be, the tilt angle, as well as information for the parts of the plate that needed to be shot on stage or animated in the computer. All [of those factors] were thought out for every shot in every scene — which was roughly multiplied by a thousand, since we wound up with something like 1,300 backplates."

The approach did have its limitations, however; the live-action crew couldn't just plug in the Workbook data and shoot. "Although the virtual sets in 3-D Workbook were built from data that was gathered on location, they were kind of crude and didn't quite match when we got out on the location," Krepela explains. "The cinematographer and crew therefore had to tech-scout everything, then set up the camera, photograph the plates at the right time of day, and shoot the tracking balls and reference passes."

3-D Workbook enabled *Dinosaur*'s directors to plan for in-camera special effects, including live-action splashes, explosions and other complex interactions needed to make audiences believe that their digital protagonists were actually in the shot. Eskuri recalls, "Neil Krepela and I meticulously planned the entire sequence before we went on location so that when the backgrounds were shot, everything would work together. If a certain shot was going to be 79 frames long and called for practical meteor effect, then the first meteor would hit at frame 23 and the next one would hit at frame 53, and those events would happen on location at those exact frames. If it didn't happen right on target, we could slip the sync."

Krepela then selected the VistaVision equipment, chose the film stocks, and rode herd on the two separate live-action crews shooting backgrounds in locales as diverse as Australia, Jordan and the Los Angeles Arboretum, ensuring that the camera angles, lighting and effects played as planned. Most of the exteriors — either day-for-night or day-for-day — were shot without benefit of electric lights using Kodak EXR 5248. Aerial plates filmed via helicopter were shot on Kodak EXR 5245. In addition to on-set visual-effects supervisor/cinematographer Terry Moews, a team of cinematographers (Steven Douglas Smith, Tim Housel and Dave Hardberger) was assembled to handle the mammoth shooting chores around the world. "It was two years of pretty intense production spread over four years," Krepela says. "It didn't feel as if we spent two years doing one movie; it seemed as if we had two years to do four movies!"

Between shoots, Krepela continued helping with the setup of *Dinosaur*'s animation facility and other assorted tasks, such as planning out and building a special cable-operated, computerized camera system. Dubbed the "Dinocam," the rig could rise and fall 70 feet to simulate the soaring perspectives of prehistoric flying creatures, to glide breathlessly over broad Cretaceous vistas filled with gargantuan herds, or to create fast-paced moves whizzing overhead for chase sequences.

The Dinocam concept was inspired by Krepela's participation on *The Boy Who Could Fly* (1986), which marked the first use of Garrett Brown's Skyman system, a cable-driven, manned camera platform that allowed the operator to spin 360 degrees for unimpeded pans while controlling the downhill speed via brakes. He also studied the capabilities of James Rodnunsky's Cablecam, which hangs a camera dolly from a ropeway suspended between two fixed points. "Skyman was a three-point system that was highly balanced and very carefully servoed, and it did a lot of cool things, but I thought a very simple, cable-operated camera would be the ticket for *Dinosaur*," says Krepela. "I figured if we just had two towers and a smaller, motion-controlled camera, that would be a great piece of equipment. We could film in pretty rugged areas that didn't have roads, where we might have problems laying long,

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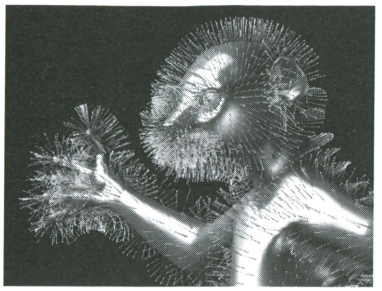
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A revolutionary "fur rendering" program was used to give the film's lemurs a realistically hirsute appearance. The creatures' skin was made the same color as their fur to reduce the number of individual strands required for each character, thus saving considerable rendering time.



extensive dolly tracks. So I said, 'I'm pretty sure we can use this, but we have to start building it now."

Krepela's instinct was right, and his Dinocam changed the look of *Dinosaur*. Unlike Brown's three-tower setup, Krepela's system used twin towers, which enabled him to create much more precise moves. "Skyman was a pretty fantastic use of technology, but there have been a lot of advances [since it was invented]," Krepela says. "Cablecam carries people and is larger and harder to set up, and it's not programmable. We wanted to be able to move up and down and control height very precisely in level flight. That's one nice thing that Dinocam had over Cablecam: it could go up and down quite a bit and sustain position nicely. They could put it in place in a day, program it for a day, then the crew would show up and hit their marks. The Dinocam was very programmable and very precise because it was all computer-controlled. We could even skim across the ground and program for all of the little rocks that came along, and it would be very repeatable."

The Dinocam proved to be a great asset, especially because certain locations could provide multiple background plates when shot from different directions. It was used extensively on the stunning opening sequence, in which Aladar's egg is stolen from its nest and ends up on Lemur Island. Although the sequence appears to be one long, continuous move, it was assembled from bits and pieces shot in Venezuela, Australia, Hawaii and the L.A. Arboretum, as well as several different views filmed in Florida. "If we needed two or more setups in the same location, we would set up our two towers to shoot one angle, then we could just move one tower later on to shoot a completely different angle that was anywhere from 30-180 degrees off the original setup," says Krepela. "If we needed another view, we would move the first tower, and we could keep leap-frogging around. In the opening sequence, we placed the two towers on a guy's ranch down by Orlando, Florida, got several shots off — including the running water and the big reveal of the valley — then moved the other tower to shoot the plates for the Carnotaur chase."

Shooting the backgrounds was just the beginning of the process, however. Those plates were then digitally manipulated and combined to create eye-popping Cretaceous vistas. "Even though it was photo-realistic, we preferred to call it a 'heightened reality,'" says Zondag. Adds Leighton, "That means everything had to be touched to make it all fit into an older, primal world."

Once the backgrounds were photographed -- and ultimately, some 800,558 feet of live-action film was shot -- someone had to look at all of the footage and select which pieces would end up in the movie. "I looked at every frame they shot many times, along with Tom Bryant, visual-effects editor," Krepela acknowledges wearily. "We tended to use a lot of single locations per shot, so we would select separate pieces of various background plates and combine them. For instance, you might see three different sections of the L.A. Arboretum blended with six sections of Death Valley in a single background. We were constantly tweaking the landscape to make it look like an interesting place. We treated the background plates as characters because after the meteor hits the Earth, the environment changes a great deal, [and that] drives the action."

This story point, in turn, drove the huge leap in computer animation that makes *Dinosaur* so revolutionary. "Our backgrounds are undeniably real," says Marsden, which meant that *Dinosaur*'s CG creatures had to move as realistically and look as detailed as they would in real life. "We spent tons of time programming all of that organic information into our characters. It was the basis from which all things sprang."

Zondag notes, "We had to do our homework to build better models that had as much rich detail as possible, then integrate the characters and the lighting into the composite." Leighton adds, "To do that, we knew we would have to build a facility."

Jim Sepe, director of technology at Disney's Feature Animation, had worked with Silicon Graphics

computers in the defense industry before segueing into the more lucrative entertainment business. He was instrumental in building Disney's Southside Animation Facility, which gave birth to both *Hercules* and *Tarzan*. "We were used to projects that required hundreds of thousands of files, but we needed something like 100 million files to make *Dinosaur*," Sepe says. "So in the fall of '96, a group of eight people led by Steve Crew, our system architect, left the traditional world of technology and began building the new Northside facility and the digital infrastructure that made *Dinosaur* possible. We knew there would be a life for this facility after *Dinosaur*, so we didn't want to limit our digital studio. We needed to be able 'grow' our system to the next generation."

The entire *Dinosaur* movie resides in various forms within the rows and rows of metal towers filled with SGI processors that crammed the massive, sterile Northside facility, which features sheets of tape on the floor to remove unwanted dirt from visitors' shoes. The sequences the animators created are kept online for fast access on a high-performance disk system. Off to one side is a glass silo, a "near-line" tape-storage unit housing the entire film — thousands of terabytes of 0s and 1s with room to spare, where any part of the film can be called up on 24 hours' notice. The film also exists offsite on a mind-boggling 70,000 archival CD-ROMS.

Most of the Northside hardware was used to render *Dinosaur*'s incredibly dense images. "We used more than 600 computers to animate and render *Dinosaur*," Sepe says. "Our dedicated render farm consisted of 250 memory-intensive Silicon Graphics CPUs, ranging from 0-2000s to 0-200s. In addition, we had 300 or so SGI desktop machines, ranging from R-10Ks up to Octanes, used for animation and effects, which would kick in if they were idle for more than five minutes. The idea

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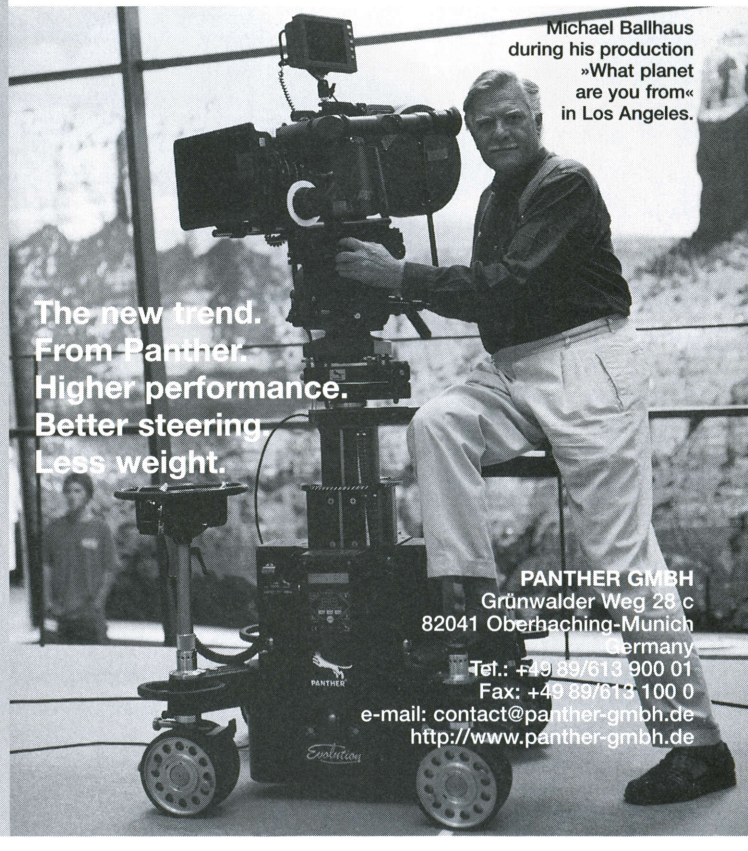
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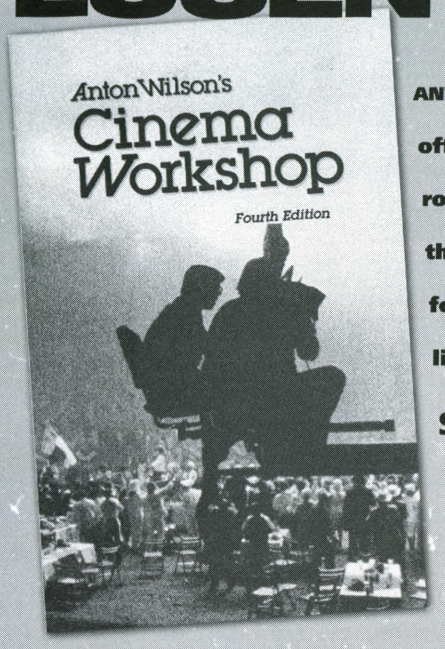
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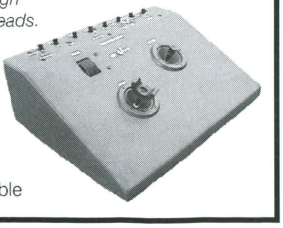


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Giant Steps

was to squeeze every last CPU cycle out of this building. It took about 3.2 million hours of rendering CPU time to complete the film, which we figured was like one processor running continually for 365 years!"

As the capability to create photographically realistic CG characters approached, model development supervisor Sean Phillips and his team began building the most computationally dense digital dinosaurs ever. "If you saw our models displayed in wireframe, some of them literally looked like a solid mass," says Phillips, who helped create visual effects for *Waterworld* and consulted on *Species* at Boss Film. "They were so dense you couldn't see a whole lot of individual wires. We also worked with a group of motion technical directors to build the animation controls and the muscle-and-skin system. Because we had photographic backgrounds, what we put on [the dinosaurs] had to look just as convincing."

Dick Zondag (Ralph's older brother and co-director of *We're Back: A Dinosaur's Tale*) spent a year and a half working on *Dinosaur*'s story before he began animating the elderly, battle-hardened Iguanodon, Bruton. Like many of *Dinosaur*'s animators, Zondag made the transition from traditional 2-D cel animation to 3-D animation, which wasn't as difficult as he imagined, thanks to the efforts of Phillips's team. "Animation is animation, and if you know how to make something move on paper, you should be able to make it move in a computer," Zondag opines. "But Sean made the process a lot more intuitive. We didn't have to worry about writing a bunch of computer code — it was more about pushing buttons."

Or, more accurately, using sliders to select the poses needed for each body part — legs, torso, head, tail — and then editing them together into ideal key-frame poses. From these specific dramatic beats,

the in-between animation can be created automatically by the computer. "It can," Zondag admits, "but I think of almost every frame as a one-off, because that's what keeps it alive. Sometimes I'll animate pose-to-pose, other times I'll animate straight ahead. It really depends on the scene."

Zondag found CG animation easier than cel animation, but also harder in certain ways. "In CG, once your characters are built, they're built, so you can go ahead and animate," he says. "*But,* all that drawing gets done up front; I drew everything I could think of drawing — all of the base shapes, and every possible walk or run — and the modelers built them. In 2-D, you would actually just print those things up on paper and use them as reference, but in CG, we can actually re-use them, so we filed them away under 'cycles.' However, a lot of times you may not ever use the cycles, because animation calls for a certain type of acting truth — so if you use a fragment of a cycle, it might hamper things rather than helping."

Zondag's initial "Tootsie Roll" animation (the shaded wireframe model looks like the rounded candies strung together) defined Bruton's gross body movements. "That's how it works in 2-D, too — you always do a rough animation pass first. Once that got approved by the directors, I'd go into the facial package and insert the facials."

Again, Bruton's facial expressions — smiles, frowns, blinks, mouth shapes for forming words — were based on Zondag's drawings. "I exaggerated the shape of each expression as much as possible," Zondag says. "Then, if I wanted to raise an eyebrow, I would just click on 'brows' and dial up the rise I wanted."

Creating the secondary animation — the skin jiggles and muscle bulges that brought the character to life — was a collaboration between Zondag and Mark Empy,

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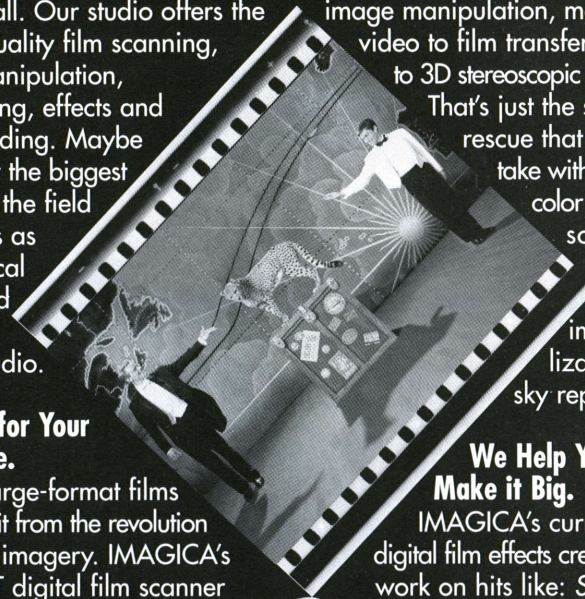
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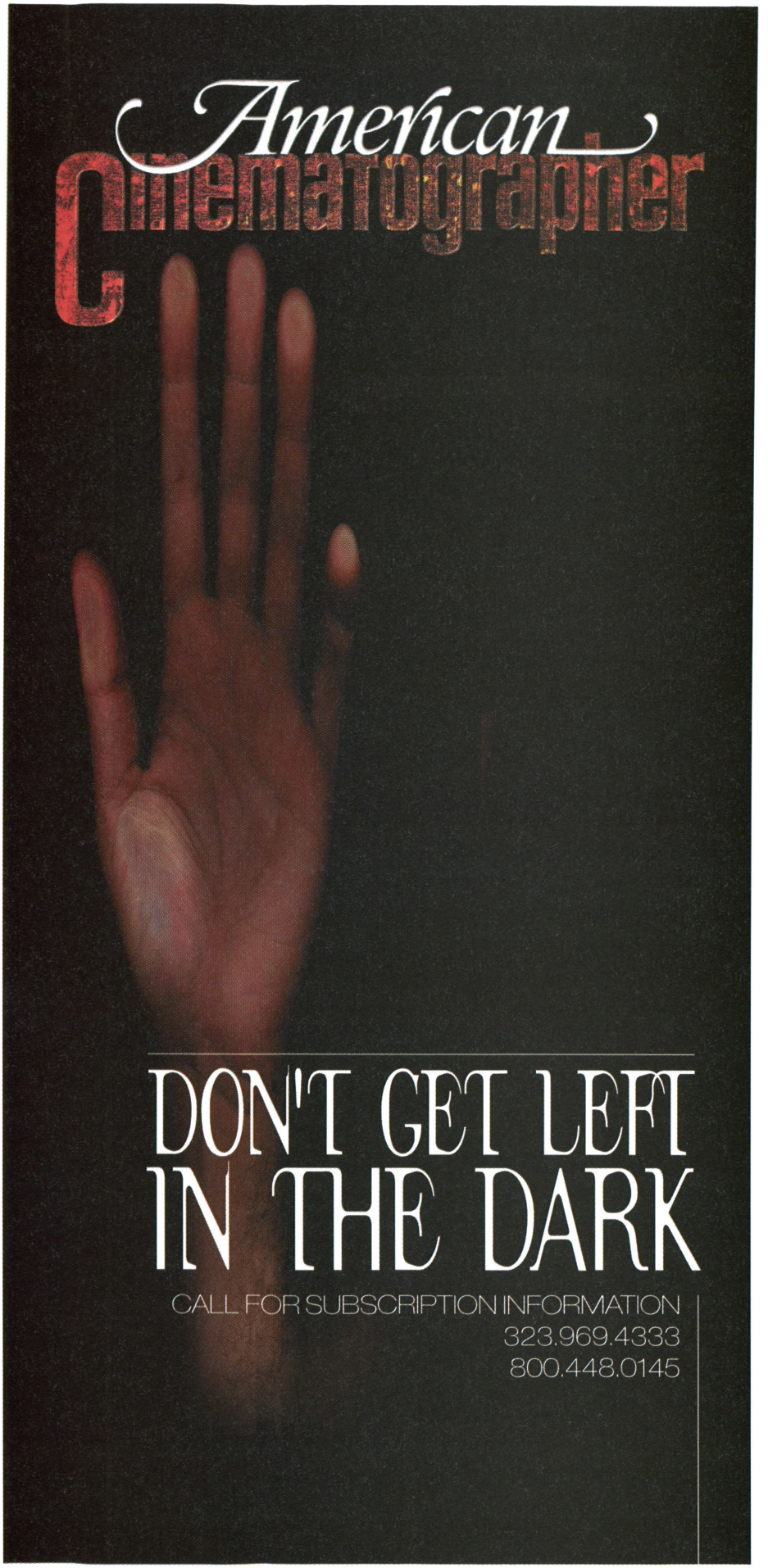
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Giant Steps

who handled Bruton's muscle and skin inertia. "When Mark got the Tootsie Roll version with all of the facial animation, I always had to make sure I gave him something to trigger the inertia," Zondag says. "If Bruton hit the ground hard with his front foot, I had his shoulder pop up and come back down, because that set off the inertia. If I didn't do that, you wouldn't believe that inertia was causing the skin to shake. But just because something works in Tootsie Roll doesn't mean it works once it's skinned, so sometimes [we had to do] more refinements."

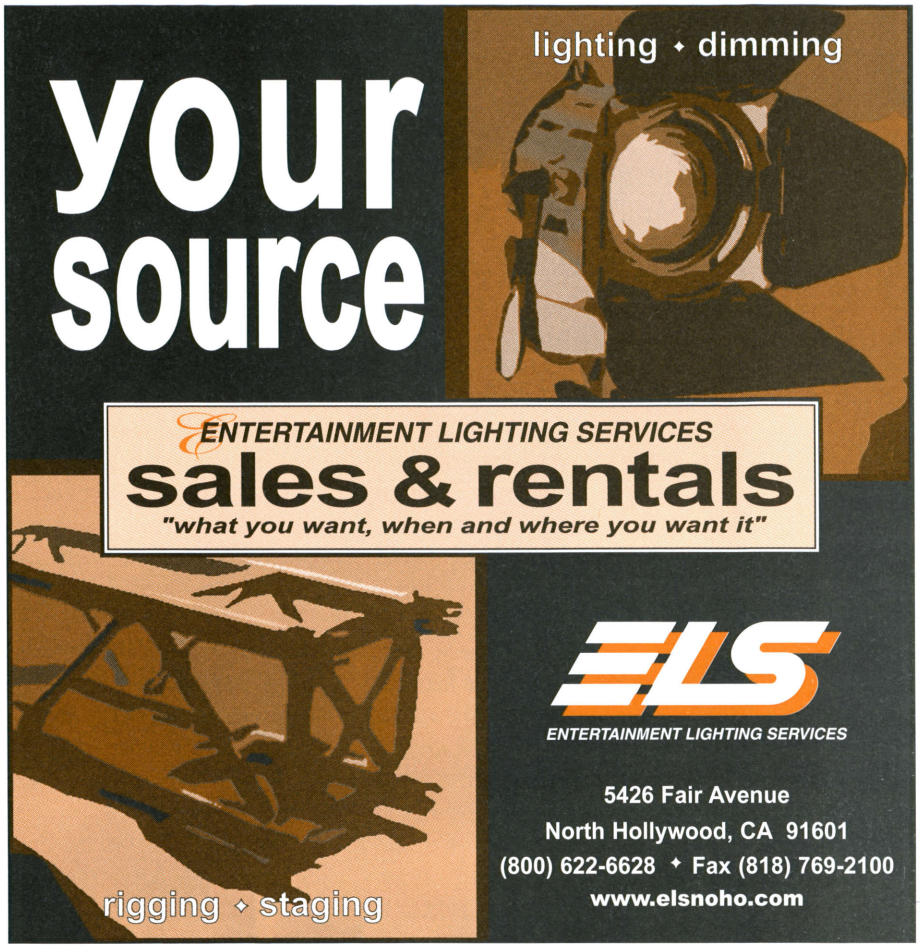
This process, including the ability to go back and forth to refine the animation or the skin and muscle inertia, was relatively simple, thanks again to Phillips's efforts in character finaling. His team, led by Ross Kameny on skin and Don Alvarez on muscles, actually defined muscle tension and skin jiggle, then applied those parameters to each character's muscle and skin models. "With 1,200 *Dinosaur* shots coming at us, we just couldn't afford the time to do that by hand," Phillips says. "We needed to come up with something that allowed us to get those kind of effects largely automatically, but still have the ability to go back in and control the parameters. We did range-of-motion studies for the characters to see how much certain muscles would bulge or how much the skin would jiggle in response to an animal stopping quickly. Then, when we initially built the characters, we'd set the oscillation rate for an average value, and run a scene of specific animation through the different models. We could control the bulging of all of the muscles and all of the skin jiggle with one slider. Then it would cascade down, and we could control those things in the limbs, all the way down to individual muscles, if necessary. We were averaging about 30 shots a week for four years."

As realistically as the creatures' skin sagged and stretched and their

muscles bulged, all would have been for naught if their textures didn't have an astounding level of detail. That task fell to Chuck Tappan, a texture painter. "Because our dinosaurs needed to 'act' in the whole movie, they needed to be very detailed, so we had to do something to them that would make them robust enough to weather the whole movie," says Tappan, a former Alias/Wavefront software developer.

Working with Cliff Brett, the project's look development supervisor, Tappan, a self-described "good guesser," developed shaders that enabled the layering of multiple texture and displacement maps over each other. Piecing these maps together lent the characters highly detailed surfaces, which allowed the modelers to reduce the heaviness of the underlying animation model while giving the dinosaurs' skin a greater feeling of depth. "In a normal 8-bit texture map, there isn't enough bit depth to get the full range of detail we needed, but with a really groovy shader, we could paint our characters using multiple maps," Tappan explains. "So I worked with a shader writer, and we came up with something that was like Photoshop."

This approach changed the painting process completely. "First, we'd do what I call a 'drive-by painting' on our dinosaur, just kind of nailing it all really quickly and roughing it in," Tappan says. "Next, we'd set up a couple of deformations in the shader and hit it hard with some displacements to see what kind of overall structure — scales and wrinkles, dings and dents, and 'skinkles,' as I like to call them — looked good. Then we'd add other maps with finer and grosser detail and start to hone everything down. As we built the textures, we realized that if we turned certain displacements up, we could get a very subtle look by not having to paint certain areas as much, or if we wanted more color, we could incorporate that in a whole new



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texture layer. We could kind of 'plug and play' the painted texture and displacement maps together, and we just became very intuitive about it."

The results are the most detailed, photo-real dinosaurs ever to grace the screen. "I believe the Carnotaurs had more than 3,600 textures, and Baylene, the old Brachiosaur, had more than 6,000," Tappan reports. "We wanted the characters to sort of jump out at you."

One of *Dinosaur*'s brilliant conceits is that these massive creatures may have shared the world with the first mammals, the meek who would ultimately inherit the Earth. This notion gave rise to what is arguably the film's most impressive technical achievement, which, ironically, has little to do with the dinosaurs: the fur program created to bring the lemurs to life. As in the creation of the dinosaurs' skin, the goal was to confine the lemurs' surface detail, hair and fur within a huge array of texture maps; this would make animating the characters far easier and allow for more intricate coloration, but it would also greatly increase the render times. The first experimental render on Plio, the lemur matriarch, took 15 hours. "We had to figure out how to do it with fewer hairs to keep down the horrendous render times," says Charles Colladay, the show's look development "fur stylist," who had previously done digital visual effects for *The Shadow* and *Escape From L.A.* at Buena Vista Visual Effects.

Colladay and his crew didn't want to compromise on the level of skin detail beneath the fur. "You never know when the hair is going to part and you're going to see [skin]!" he insists.

Colladay realized that if they could make the skin and fur work together to enhance the effect, they might be able to get away with less hair, which would significantly cut down the render time. "We realized if we made the skin the same color as the fur, we could back off on the amount of hair we needed," Colladay says. "So instead of seeing a large contrast between white fur and black skin, we're actually seeing skin that looks like fur. It's a logical idea, but it took a long time to come up with the fur/skin technique, which really saved our show." This secret weapon enabled Colladay's team to drop the number of hairs from more than 6 million to around 1.1 million per character. "We brought our render times down between half an hour and three hours per character," he says.

Nevertheless, Plio and the other lemurs remained technically challenging. "We were fighting to come up with ways of making



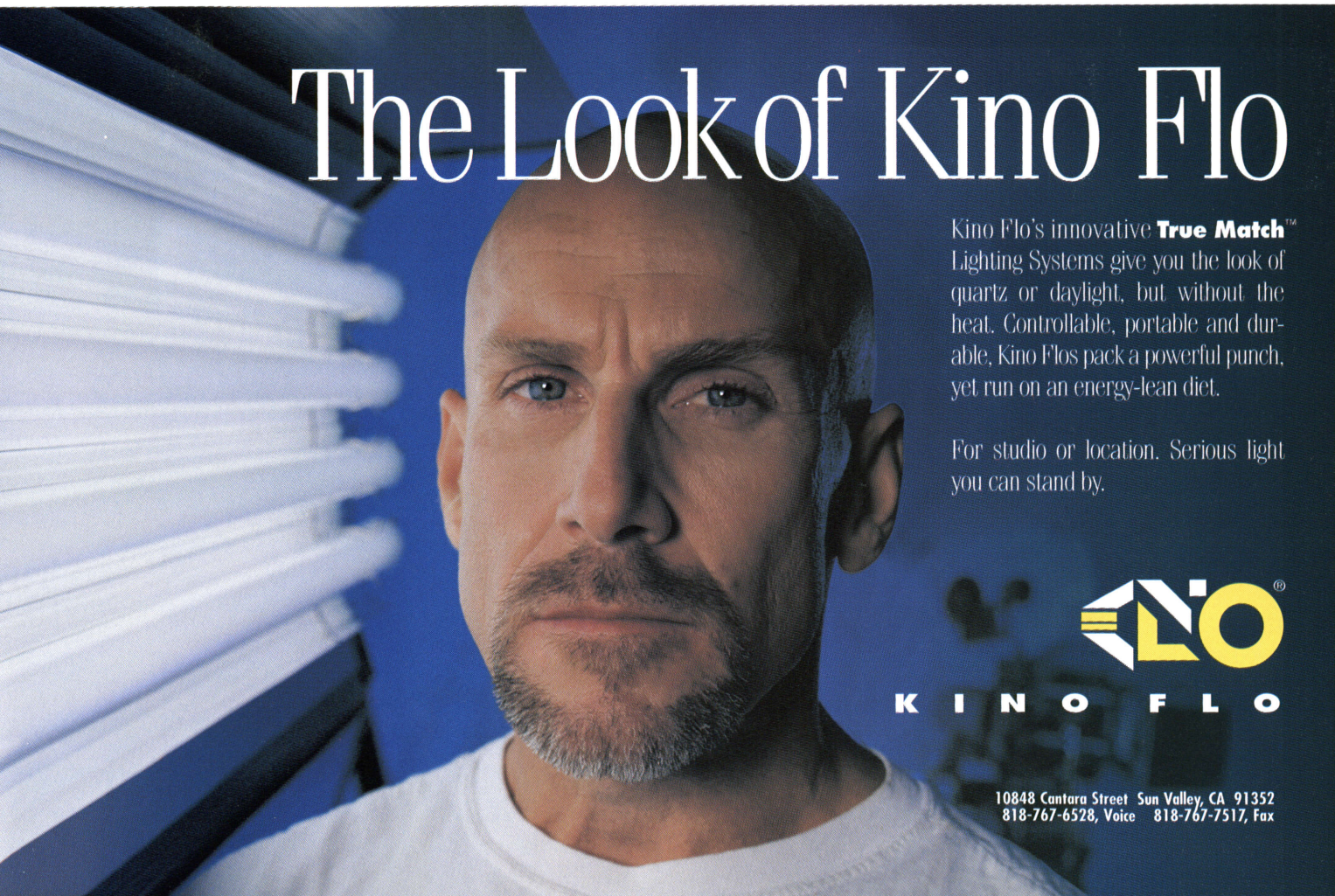
groups of hairs look as if they belonged together," Colladay says, "because individual bunches of hairs came out looking like a pincushion. Ultimately, we came up with fur patches, each of which had a whole array of maps, including color, texture, clumping, dust and so on. We had about 540 patches on Plio with nine or 10 channels, so we're talking about 5,400 channels of maps per character. Our goal was to take these characters to reality and then enhance them further, so we made a real effort to retain the balance between hair and fur, and we developed a salt-and-pepper shader, which allowed us to slightly perturb the lightness and darkness of each of those 1.1 million hairs."

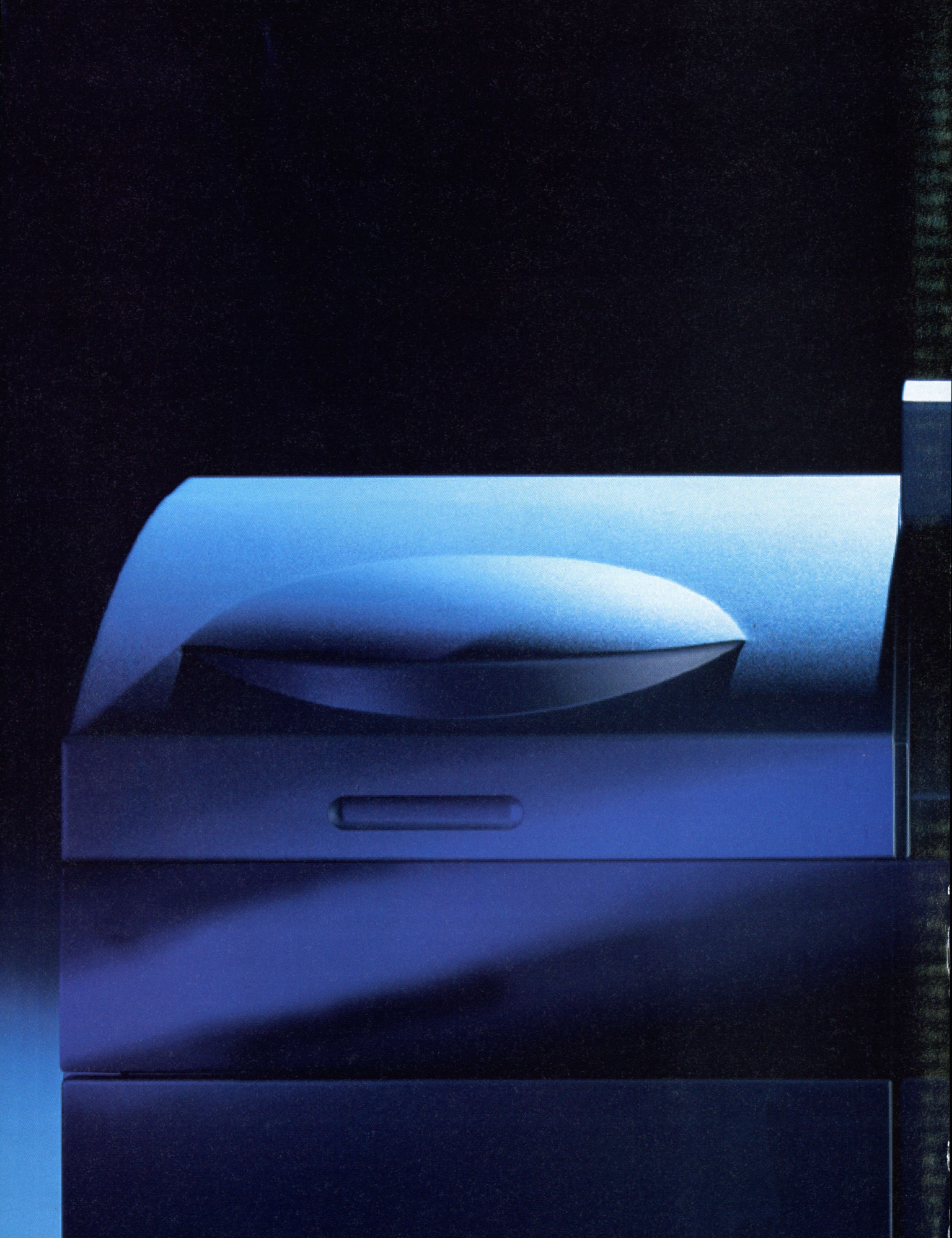
Once the setup was completed, some 40 lighting artists began dealing with issues from chattering shadows to creating the ultimate lighting effect for fur: rim light. "We created a shader controller to define the amount of light that occurs on the hair and how much is transmitted through the other side," Colladay says proudly. "So if we're looking at a backlit lemur, we can say 'X' amount -- maybe 6 percent — of that light will get transmitted through the hair, and another percentage will get reflected off the hair."

Dinosaur's hair program has not only become a staple at Disney (it was subsequently used on *102 Dalmatians*), but also helped *Dinosaur* in an unexpected way: the creation of grass. "It can look like anything you can paint on a flat surface, even unusually green hair," Colladay says. "I painted about 12 different pictures of grass on flat, rectangular geometry, and each of those was randomly mapped to pieces of hair. Put enough of them together and you've got a field."

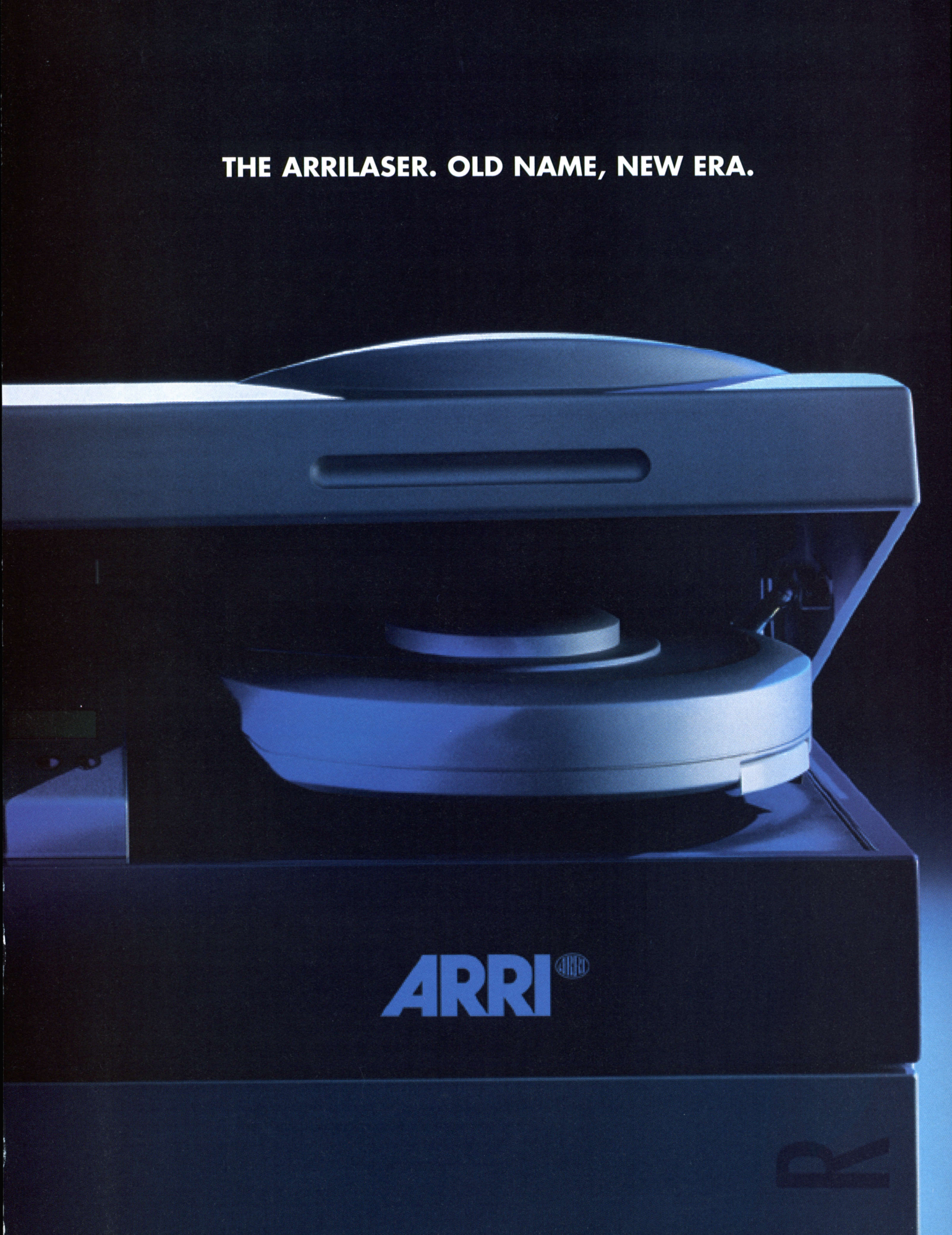
Once *Dinosaur*'s animated characters were added to the largely photographic backgrounds, Krepela finally got to see what had been shot. "It was then that I began acting like a traditional director of photography, worrying about lighting the characters and getting them to fit into the scene," he says. "Rather than quote the number of effects scenes, I'd rather say that there were just two scenes *without* any effects!"

Having worked on *Dinosaur* for more than four years, Leighton and Zondag were concerned that the technology their team had pioneered might look a bit dated by the time the film was released. "I think there's nothing more frightening than working on a picture and finding out five years later you're obsolete," Zondag says. "But I've seen films with digital effects come out [recently], and I can still beat my chest and say, 'Ours are better!'" ■





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The X-Factor



Seven different effects houses contribute eye-popping tricks to *X-Men*.

by Ron Magid

Unit photography by Attila Dory

It's been a long day at Digital Domain. A small army of technicians fiddles with what looks like a giant, 3' x 4' gold onion atop a 10'-high platform surrounded by bluescreen, scaffolding and high-speed cameras. "A giant, gold onion. Did you hear that, folks?" asks a feisty man scurrying through the crowd. That man is visual-effects supervisor Mike Fink, taking time out from an interview to brainstorm about the best way to peel that damn onion — which, he notes, happens to be a miniature of the Statue of Liberty's torch containing a lethal magnetic device.

It's just another day on *X-Men*.

Director Bryan Singer's film is inspired by the long-running Marvel comic book series, wherein Professor Charles Xavier and his band of mutants — Wolverine, Rogue, Cyclops, Jean Gray and Storm, collectively known as the X-Men — fight a never-ending battle against Magneto and his Brotherhood of Evil Mutants, led by Sabretooth, Mystique and Toad.

The project may seem an odd choice for Singer, whose *The Usual Suspects* and *Apt Pupil* were character studies that delved into society's dark underbelly. But the director insists that *X-Men* follows in that tradition — albeit featuring some intense comic-book action and about 500 effects shots. "I became fascinated with the concept, the characters and the philosophy of the *X-Men* world," Singer states. "Like the films I've done in the past, which dealt with unique kinds of criminals, *X-Men* deals with a similarly unique group of heroes, very much an underbelly — or strange augmentation — of society. And the villains are gray, not black-and-white, so the lines of good and evil are not so clearly drawn. I started to see it as an obvious choice [for me]."

The film might be a departure for Singer, but it's an ideal project for Fink, a true Renaissance man whose credits include *Lethal Weapon 4*, *Mars Attacks!*, *Braveheart* and *Batman Returns*. Indeed, every step he's ever taken in life seemed to propel him toward the visual-effects field. "I've always been a tech-head,"

Photos courtesy of 20th Century Fox.

he admits. "I learned how to run a milling machine when I was 14, and I was a photographer before I started in this business, so there are things I just knew how to do. I actually started out in Local 44 doing electronics. My first job was making lights blink on *The China Syndrome*, and then I built miniatures for a few different movies, none of which I'd rather mention! Little by little, through [doing] the electronic, high-voltage effects, I got involved in figuring out ways to do better bluescreens, and that got me involved in opticals. Pretty soon, one thing led to another, and here I am!"

through, like Magneto's device, the metal skin wants to rip the easiest way possible, which is generally in a straight line — and that's boring! It looks as if the machine rises up and literally becomes a can opener! That's exactly what would happen in real life, but there's got to be more to it, so we're trying to *pull* this thing apart.

"It's been tough to figure out how to make that happen in-camera," he continues, "because on this schedule we don't have a lot of massage time. We decided to do this as a miniature because of time and budget constraints; we also thought it would look better because the

Fink suggests a complex arrangement of wires to pull the lead skin away and reveal the steel rings of Magneto's deadly device. A techie nods his head in agreement. Problem solved.

One down, one million to go.

As the high-speed cameras finally roll, the shot is over almost before it starts, but Fink seems satisfied. "On these high-speed shoots, you say, 'Roll camera!' then 'Cut!' and everyone wonders, 'Well, what was that?'" Fink chuckles. "It always looks seriously unspectacular on the stage."

Of course, there's a lot more to the effect than just a gold onion

Opposite page: Wolverine (Hugh Jackman) is surprised to find that his sharp talons have no effect upon Rogue (Anna Paquin). This page: A member of the show's special-effects team touches up the illusion.



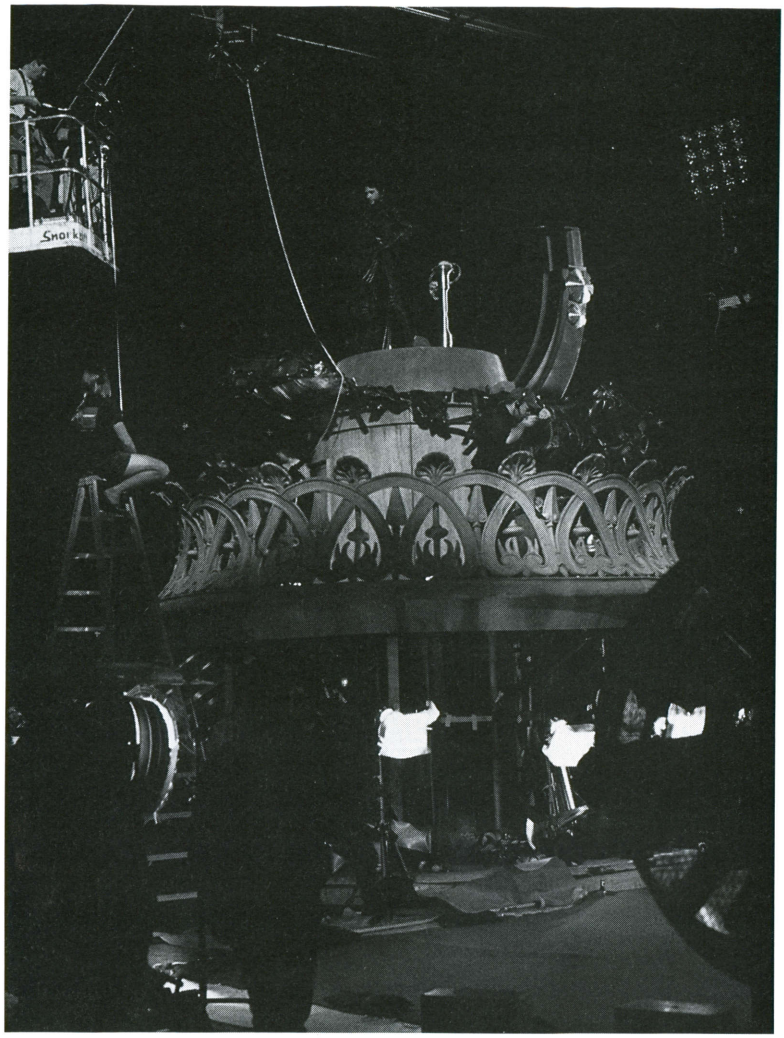
Studying the Statue of Liberty on set, Fink scratches his head. To jumpstart *X-Men*'s explosive climax, Magneto has installed a deadly machine in Lady Liberty's torch, which is supposed to be ripped apart by the machine as fireworks explode overhead and a huge convention of world leaders takes place at nearby Ellis Island. The problem for Fink is that the torch just doesn't want to rip apart dramatically. "We built this torch out of lead and then gold-leafed it to make it appear just like the real one," Fink explains. "But metal doesn't really have grain, so when we try to push something

action of those materials against each other is difficult to do in CG. We're deforming real metal that has real gold leaf on it, and it's being ripped apart by a real machine that looks like it's stainless steel. When we cut to it, the torch is already being torn apart, so it's already somewhat deformed. If we had to go from an absolutely perfect torch to a blown-apart torch, I think we would've done it in CG. Now I'm wondering whether we shouldn't have done it all in CG, but I think it will be fine." (*Editor's note: Fink later did opt to create the effect entirely via CG.*)

being ripped to pieces. "It will look much different when it's all composited with Anna Paquin [as Rogue] trapped within twirling CG hoops that rip the torch apart as they spin," Fink states. "Plus, Digital Domain is adding the exploding fireworks and a big, multicultural convention on Ellis Island."

Why set a comic-book movie in the Big Apple, when traditionally they take place in familiar but fictional places such as Gotham City or Metropolis? "That is the essence of *X-Men*," explains Singer, who says he loves the idea that these bizarre outsiders live in the real world. "It's

The X-Factor



Hugh Jackman stands atop a scale replica of the Statue of Liberty's torch, which was constructed on a stage at Digital Domain.

about people who are born different and learn to adapt to, defend and protect the society that made outcasts of them. I wanted to create something different than *Batman*, so it's very much a story not really about superheroes, but of reluctant superheroes."

Although the location is New York, not one frame of film was shot there. "Because we couldn't shoot in the real places, New York is being created digitally by Digital Domain, Cinesite and Matte World," Fink says. "Bill Maher and I went to New York and shot panoramic stills of New York, Ellis Island, the Statue of Liberty and everything else so we could use them for texture maps and tiling to create our backgrounds. But there's no principal photography in New York, and the third act takes place there! We're treading a very treacherous line, re-creating New York and saying, 'These are real people living in the real world, but they have these powers.'"

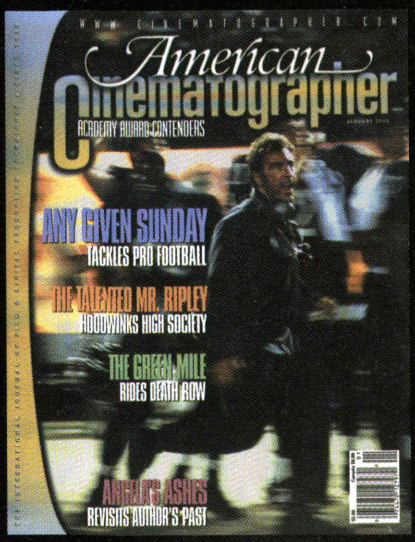
That was the least of Fink's problems, however. He found himself fighting those twin spoilers — time and money — every day on the massive production. Despite its $75 million budget, Singer almost defensively points to *X-Men*'s "very independent spirit," adding, "When you're dealing with visual effects, an ensemble cast and multiple location setpieces, [that figure is] not tremendously significant."

In fact, the film's extremely tight schedule necessitated spreading the work among seven facilities — Digital Domain, Cinesite, Kleiser-Walczak, Matte World Digital, Core Digital, Hammerhead and POP Film (soon to be known as R!OT) — whose workload ranged anywhere from 12 to 200 shots, usually divided by mutant effects. "There are some huge sequences and some really difficult scenes in this film that have not been done before," Fink says with a sigh. "And we're doing it on a crushing schedule."

One of *X-Men*'s most challenging sequences, in which Professor Xavier (Patrick Stewart) uses Cerebro, a spherical room designed to take him on a telepathic search for mutants, fell to Cinesite and visual-effects supervisor Micheal McAlister (whose credits include *The Truman Show* and *Waterworld*). "We're creating the full-circle room and putting it behind Patrick, because all that existed on-set were some 'insert walls' — just enough to put behind two people standing on a ramp so they didn't have to do comps for every shot," McAlister says. "But we're doing anything that's bigger than a medium shot."

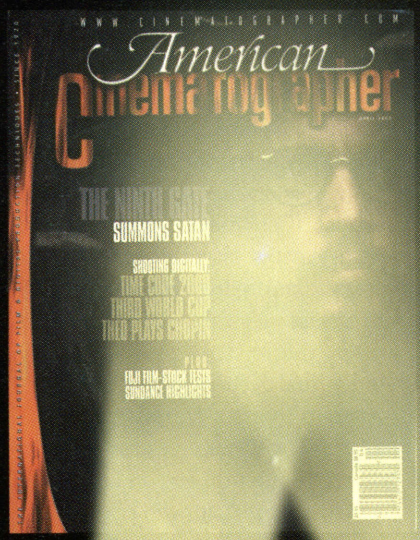
This includes a spectacular, seamless one-minute shot designed to take the audience on Xavier's journey into his mental netherworld. "The room starts to expand in diameter almost to infinity," McAlister reveals. "Then there's a visual transition from the physical room into this mental world, where we see the mutants start to resolve themselves out of kind of a fractal fog. Eventually Xavier finds who he's looking for — Rogue — and the train station she's in begins to form around her."

The challenge was less creating and animating a virtual set than figuring out how to convey the fact that the spherical room was expanding. Apparently, just making the sphere bigger did not sell the concept. McAlister elaborates, "It ended up looking like some sort of two-dimensional wipe effect, where









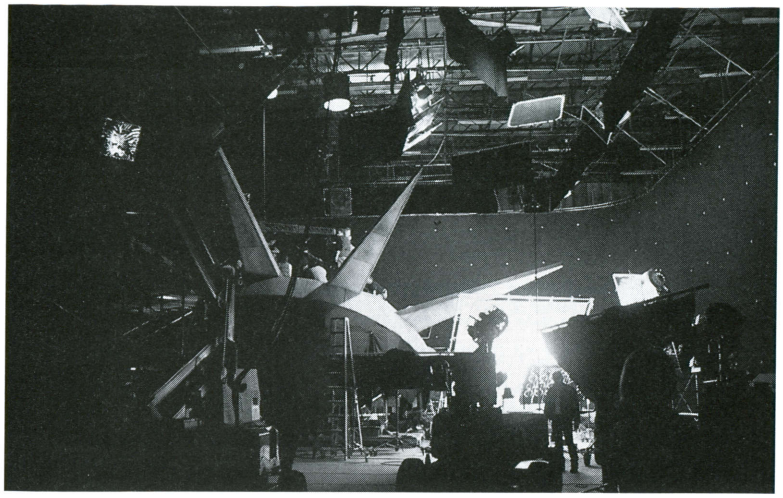




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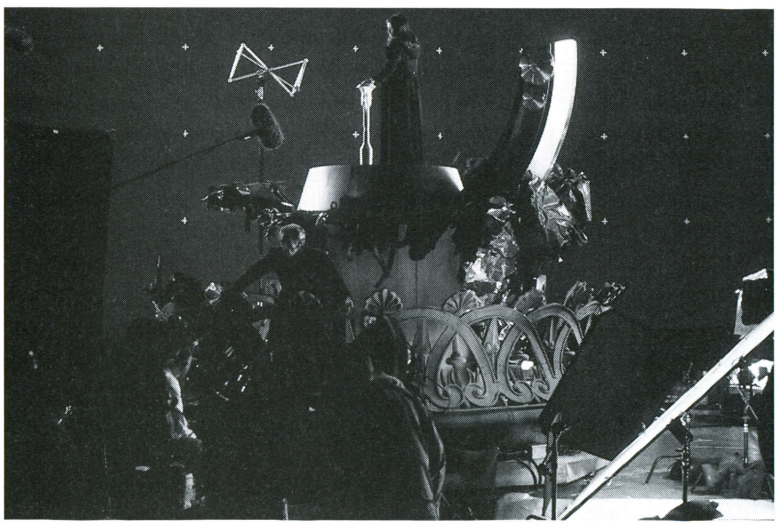
Right: Crew members at Digital Domain illuminate a replica of Lady Liberty's crown, which is surrounded by bluescreen material that will allow the later addition of a nighttime cityscape. Below: Atop the scale torch, actress Anna Paquin directs her gaze at a marker indicating the position of a visual effect that will eventually enhance the scene.

you're just shrinking something back into space rather than the sphere itself getting bigger. It looked as if we were shrinking the tiles and other wall details down.

"In terms of the psychology of perception, there are three principal visual cues that tell human beings how far away something is: aerial perspective, where things are hazier in the distance; converging lines, like railroad tracks; and objects in the foreground overlapping things in the background," he continues. "None of those were available to us, so creating the illusion that the sphere was gradually getting bigger was kind of a nightmare!"

Singer decided that the best way to tackle the scene was to invent a new shot. "The original shot was conceived and photographed from the center of the sphere, but the only way to make the sphere look like it was getting bigger was to fasten the camera to the wall," McAlister says. "That way, the camera moved backward from the center of the sphere with the wall as the radius grew bigger, so that Xavier, whose head was exactly at the center of the sphere, got smaller and smaller. That was the only way I felt the audience would understand that the room was getting bigger; Xavier is getting smaller and we're still inside the room. That was tough."

Again using SGI hardware, a 3-D model of Cerebro was built and animated using Maya, then rendered using RenderMan. "We created a spherical model with multiple layers of concentric tiles that rub up against each other," McAlister explains. "When the radius of the sphere expanded, the tiles slid over themselves, revealing new tiles, like a spyglass extending." While Cerebro finishes expanding, the camera dollies 180 degrees from a medium shot facing Xavier to an over-the-shoulder shot as the walls begin glowing and the room literally comes apart.



"There's a big transition from a physical space to more of a mental space," McAlister says. "The tiles separate and shoot out toward a vanishing point in the middle of frame, as if there's a black hole out there sucking everything off into the distance. No sooner do those glowing tiles converge on infinity then the black hole reverses itself and spits out this sort of 'mental fog' made of shapes that go shooting past the lens, as if you're looking up at fast-moving raindrops. As they slow down, we realize that these shapes are actually individual consciousnesses represented by human figures.

"The camera eventually tilts down through the fog and discovers a matrix of people who emerge and resolve themselves out of moving fog. As Xavier searches for Rogue, the detail grows on each person, then fades when he realizes that it isn't Rogue and goes on to someone else. Ultimately, he finds Rogue in the train station, and as soon as he connects with her mentally, the train station forms behind her and he knows where she is."

The sequence was a tracking nightmare. "It's beyond a nightmare," McAlister insists. "Not only does the camera move start with a wrap around Xavier, but once we went over his shoulder, we needed to track the various consciousnesses in this amorphous environment for about 40 seconds' worth of footage. Mike Fink [and Rpin Suwannath conceived the sequence and] shot two groups of actors — as well as lots

of individual people playing the mutants in the fog — against green-screen, and then we re-created the camera move on them so the fog envelopes and tracks with them. We didn't have an on-stage move because our elements were digital; we had to make the CG elements fit."

McAlister found creating the glowing tiles and the human raindrops easier to do. "The tiles are part of our 3-D model, so we just re-lit them to glow. Then we 'treated' photographic elements of real people, mushing them up so they all come blasting at us symmetrically from the vanishing point right in the center of frame."

How long does such a shot take? "I pitched my first concept of it a year ago," McAlister says wearily, "and we've actually had elements to work on since about the end of January. It's now April and we're still working on it."

Cinesite worked on its share of mutant effects as well, including Toad's tongue and Storm's glowing eyes. "We have a little more than 30 toad-tongue animations to do, which I found an equally creative and challenging task," McAlister offers. "We wanted to make a tongue with serious attitude that could snap your head off! I approached Toad's tongue as a character, a 30-foot-long, fully articulating appendage that attacks and grabs. There's a lot of on-set interaction we had to animate to, including slamming doors and people being thrown about. Again, we used Maya for that."

As for Storm, Halle Berry's digital contact lenses raised some protest from diehard *X-Men* fans, causing Singer to reevaluate his approach to Storm's eyes. "The director altered his concept because white eyes become nothing more than white eyes," McAlister says. "We're working to come up with a solution that actually enhances her character, so that when she really gets angry or cornered, her eyes will glow."

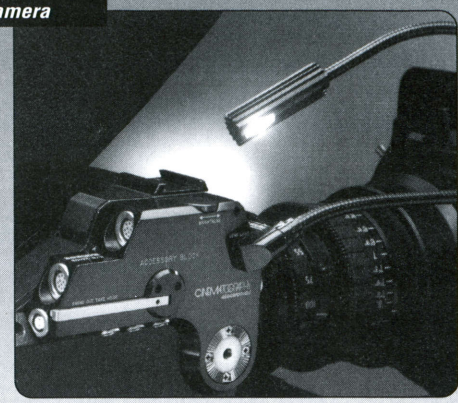
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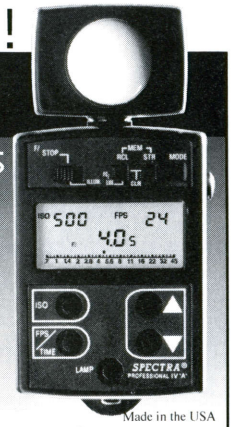
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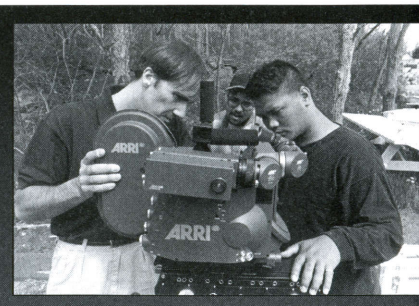
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The X-Factor



Mutants use their powers to levitate a pair of police cars. In reality, the cars were held aloft by wires that were later removed during digital postproduction.

Hammerhead Productions was also charged with creating several of the X-Men's supernatural powers. Although Wolverine's claws were practical in many shots, whenever they had to extend or retract from his knuckles, the claws were computer-generated. Using SGI workstations, the claws were first modeled in Hammerhead's proprietary "Z" 3-D effects animation system, tracked in its Academy Award-winning ras_track program, rendered with Pixar's RenderMan and integrated using in-house rotoscoping and compositing tools.

Beyond the 30 CG claw shots, Hammerhead developed Wolverine's healing effect for seven shots. The forceful red laserbeam blazing from Cyclops's eyes was also created via the Z animation system; the goggles that control the beam were modeled by Oakley, the sunglasses manufacturer, and then used as a basis to create CG glasses for certain shots.

Finally, Hammerhead tackled the challenging "Rogue Effect," which involves the draining of a person's life force. "The transfer of this power had to be noticeable both leaving the prey and transferring to Rogue," says Theresa Ellis, Hammerhead's visual-effects supervisor. Technical supervisor Thad Beier adds, "This effect was created first with paintings done in Photoshop on a Mac. These paintings were then tracked into the shot using ras_track and composited using our in-house software. When we're blending intricate, detailed texture into the skin of a character, our most challenging technical issue is tracking, especially while both the camera and the characters are moving. Any error in the tracking would completely destroy the illusion of reality."

The superpowers of the shape-shifting Mystique are showcased in a dozen shots so complex that they were assigned to Kleiser-Walczak at the beginning of the show and were still being worked on as the delivery date loomed. "The obvious way to do it was with a two-dimensional morph from one plate to another," says Frank Vitz, the company's visual-effects supervisor, "but Mike Fink and Bryan [Singer] wanted something that looked more alive — really cool, beautiful and obviously not two-dimensional, yet also subtle and graceful."

At one point, the buff, fully clothed Wolverine had to transition into the feminine Mystique (played by Rebecca Romijn-Stamos), who is blue, covered in scales and nearly naked; this meant that cyberscans had to be made of both actors. "Mystique was a good character for this effect because her costume was basically an eight-hour makeup job that involved gluing little scales all over her body and painting her blue," Vitz says. "We scanned her wearing a small bathing suit. We initially scanned the other actors [whose characters she transforms into] in small suits as well, but we realized that that [wouldn't produce] what we wanted. Because Wolverine wears a big, leather costume with lots of detail, we had to rescan [actor Hugh Jackman] in his full X-Men suit. Once both actors were scanned, we had to refine those models to create a correspondence between their skeletons so that we could three-dimensionally blend from one shape to the other. We used nurbs models, which made things easier than they would have been with polygons. Then we created a really beautiful way of orchestrating that blend."

In order to add dimensionality to the transition from the leather-clad Wolverine (and other characters) into the nearly nude Mystique, Kleiser-Walczak's animators spent a month digitizing the 10,000 scales on Mystique's body so they could animate them erupting from her skin. "The scales are the heart of the effect," Vitz insists. "There's no way to do that with texture maps and painting, so they actually had to be physical scales. We were gagging Maya for a while because the process involved so much data! Each scale is very simple, only about 10 polygons per scale, but there are 10,000 of them, and each has its own little pivot and can animate individually. They actually grow out of Mystique's skin like feathers — they sort of ruffle and then lie back down. As the effect comes up over the horizon of her shoulders, you really get the feeling of perspective and dimension, which makes it much more alive."

To create the transformation

of Wolverine into Mystique, Kleiser-Walczak's animators first superimposed Mystique's digital Maya skeleton model over the photographic background plate of Wolverine, then keyframe-animated her movements to exactly track his. The animators then substituted the digital Wolverine model onto that same skeleton and refined the animation further, essentially creating a synthetic Wolverine whose edges and motion matched perfectly to the real Wolverine. After that, the technical directors created a texture map from the plate of Wolverine and mapped it back onto their synthetic character.

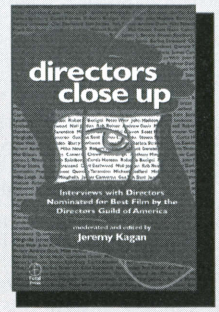
"Now it looks just like Wolverine, except he's synthetic," Vitz says. "From there, we can distort and change his shape into Mystique starting from the real plate. It's fully procedural in that once the models correspond to each other, we can actually put them on a slider in Maya and transition from one to the other. But we choreograph everything by hand, so it doesn't happen at once. We gradually move virtual lights over an all-white version of her body so the areas not illuminated are one character, and the areas that are illuminated are the other. As the lights pass over her body, they define the edge of the effect, so by choreographing the lights we choreograph the progression of the effect. Once all of that is set up, the mechanics of changing from one to the other, including the scales coming out, is procedurally driven."

Meanwhile, Core Digital in Toronto has created the movie's "Map Room" sequence, in which a huge 6'-wide table made of steel pins rises up to form a 3-D topographical map of New York City. "It appears that the actors can control the table with a track ball, and the pins come up and form a 3-D map," Fink says. "The map it displays pin versions of the Hudson River, Manhattan and the Statue of

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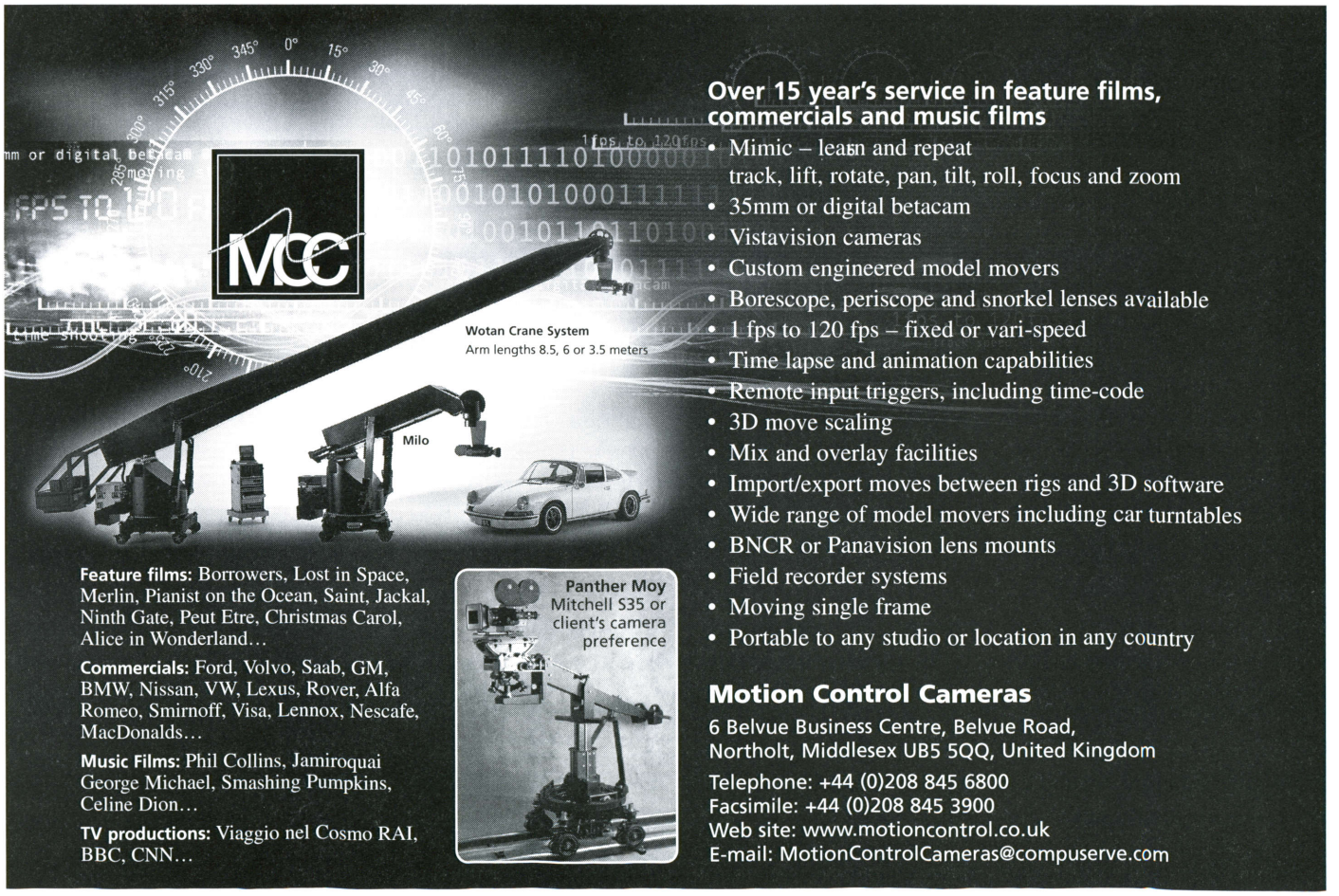
Liberty, and Core created virtual fly-throughs of the landscape."

And then there's that onion — Liberty's torch — at Digital Domain, whose artists are only doing two model shots for *X-Men*. (Everything else is CG.) "Digital Domain is doing all of the effects related to Magneto's powers, plus most of the X-Jet effects, which amounts to about 130 shots," Fink observes. In fact, Magneto's powers reside inside the torch, where Rogue is held prisoner — which explains why the film's climax takes place on and within the statue, which was created digitally. When Wolverine, Cyclops, Jean Gray and Storm come to save Rogue, Magneto ties them up inside the statue using CG straps courtesy of Digital Domain, then heads up into the torch and turns on his insidious machine, whose magnetic reverberations will transform the populace of New York into mutants.

In short order, however, Wolverine breaks free and fights the evil Sabretooth atop Liberty's crown. One stunning shot follows Wolverine as he gets thrown off the statue, grabs hold of a spike, swings around and regains his footing. This sequence demanded the animation of a CG Wolverine by Digital Domain's artists, led by visual-effects supervisor David Prescott.

Within the torch, Magneto revs up his machine, which resembles a gigantic atomic model. Its steel rings revolve around Rogue, who is handcuffed in a spread-eagled position at its center. "She was shot in the middle of a full-size setpiece," Prescott explains. "We surveyed Magneto's machine and rebuilt it as a CG model so we could have full interaction with the live set. We added two CG rings spinning around a common axis like a gyroscope, and put the light effect around it all. Whenever we see the machine in close-up in operation on the torch, the machine is CG and the torch is a set. When we see these from a distance, the torch, arm and statue are all CG."

Once the machine starts, it unleashes what Digital Domain's artists call "the Magneto Effect" — magnetism on a vast scale — along with the machine's signature light effect. The trick was conveying such an amorphous concept visually. "It's very undefined, and nobody really knew what it should look like, so it's as though we were told, 'Okay, create the next cool thing,'" Prescott says. "Portraying the magnetism was a little easier than creating the light effect. To create the sense of magnetism, we generated these weird-looking frames that had red and blue channels. We then pulled the background image through those in the composite and



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rewarped it left and right to create something like a heat signature.

"The light effect is a big, evil, spherical shape with graphic scribbles on its surface, which volumetrically project themselves into the surface in layers. We generated this sphere using a ton of math to get it to flow out and grow into the scene, and the light effect comprised tons and tons of particles rendered in 3-D. It has a penumbra, which blows out and drips like gelatin over surfaces, so to make it interact with the actors and flow around things we had it collide with various hold-out objects. When we rendered the layers of light using RenderMan, the renders looked pretty strange because they were just black-and-white images, which we pasted together at the compositing stage. Each shot varies between 10 and 20 layers, but you never see the black-and-white renders; we used the high contrast of those elements in the composite to warp images through and to generate light."

As Liberty's torch is destroyed (the gold-onion model was shot at high speed and augmented with CG light and magnetism), Wolverine lands atop the machine and rips into it, sending metal flying as the light effect dissipates. "Wolverine was shot against greenscreen miming the action of ripping the machine apart," Prescott says. "The destruction of the machine was done with CG. We added the spinning hoops and timed them to his actions. It was a lot of work to get the plate to match what you would imagine that much light would be doing to the background."

Despite the production's heavy reliance on CG, Fink says he relished doing as many effects in-camera as possible — and Singer preferred it. In one scene, a Vandegraff generator pumped five million volts of static electricity through Sabretooth and Storm simultaneously, very simply and inexpensively creating an awesome effect that would have been quite difficult to do digitally. For Fink, that shot characterizes his experience with Singer. "Because of Bryan's strength with characters, we've actually got scenes where people act and do things that people do, unlike other superhero films, where [people are] just walking through the scenes between effects sequences," Fink says. "That's great, because it gives me an opportunity to do effects that are story- and character-driven. It also allows me to do less obvious effects, which is one of my great joys. Doing something subtly, if it enhances a character, is more important than doing something over-the-top that stops the story." ■

"Beyond The Frozen Moment"
Time Manipulated Effects



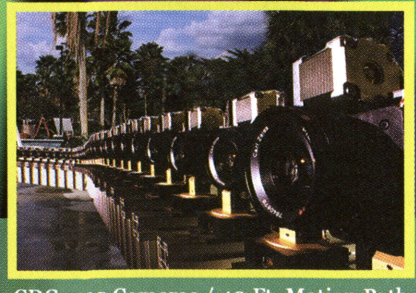
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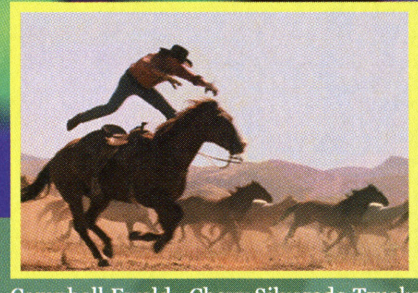
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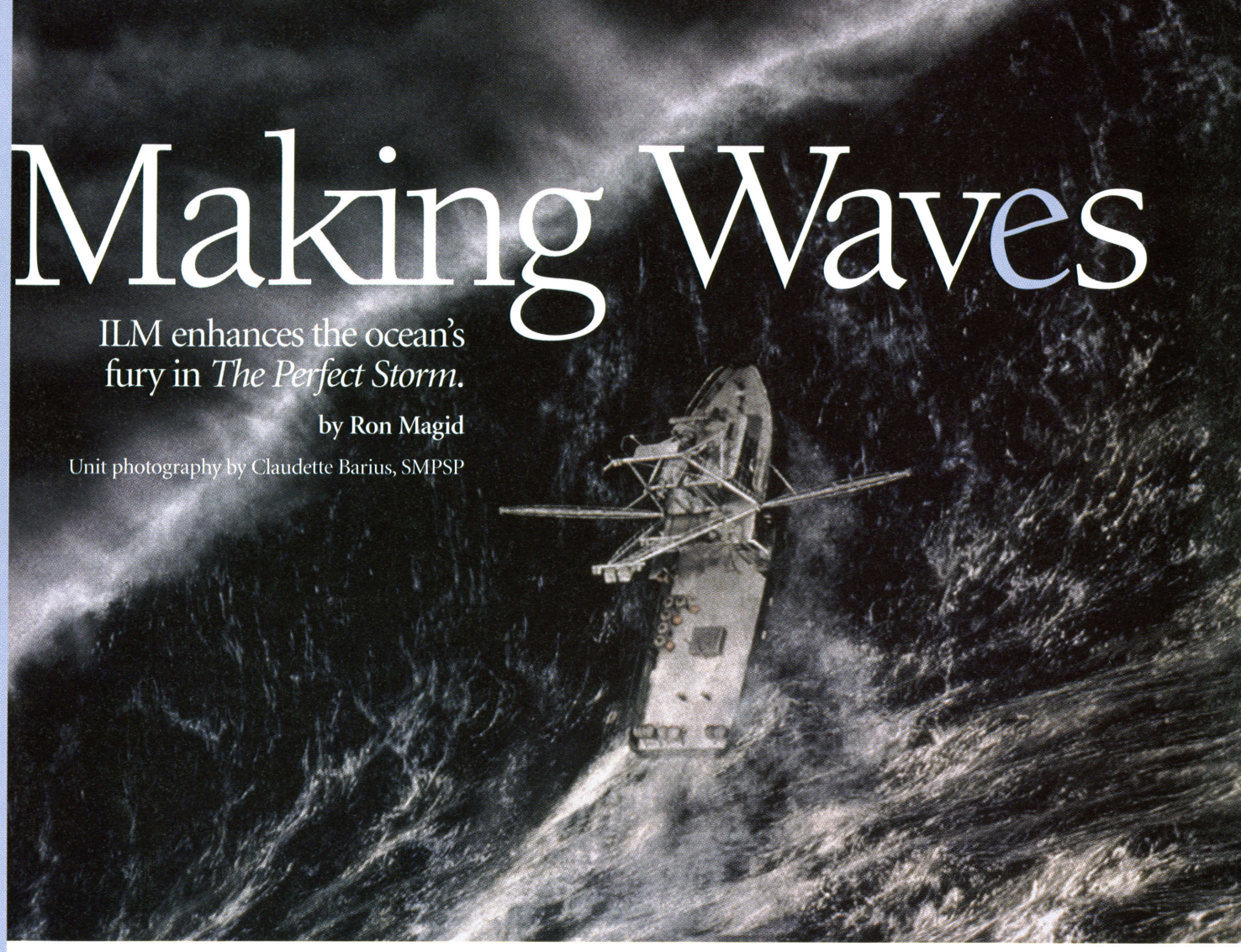
PAWS

Making Waves

ILM enhances the ocean's fury in *The Perfect Storm.*

by Ron Magid

Unit photography by Claudette Barius, SMPSP



I saw *The Perfect Storm* as an enormous challenge, because like *Das Boot,* reality is the headline above everything," says director Wolfgang Petersen, who maintains that his latest project was just as daunting to make as his seminal World War II U-boat thriller. Based on Sebastian Junger's best-selling book of the same name, *The Perfect Storm* is about a crew of long-line fishermen who head out from the small town of Gloucester, Massachusetts, to catch swordfish on the Grand Banks. On their way back to port, they find themselves caught in the middle of the legendary October storm of 1991. Described by meteorologists as "the perfect storm," a true freak of nature that develops maybe once in 100 years, the deadly storm resulted from the collision of three major weather systems.

The challenge for Petersen was to prevent Mother Nature from overwhelming the real-life saga of the men aboard the fishing trawler *Andrea Gail*, which disappeared amid the ferocious storm. As he was putting the finishing touches on the film, Petersen observed, "It's an enormous human drama, very moving, and in order to create all of that, you need a lot of effects. I'm working very closely with Industrial Light & Magic not to create effects, but to create reality."

To bring the supernatural storm at the heart of the film to life, real water-on-water photography was combined with literally tons of practical effects, plus the most advanced digital techniques. "We used all of the tools available, including massive stage work on Stage 16 at Warner Bros.," Petersen says. "The only thing we didn't use were conventional miniature models." The result is not only the most important development in visual effects this year, but arguably the most dramatic.

Petersen's expert visual-effects commandant, fellow German Stefen Fangmeier (who earned an Academy Award nomination for his work on *Twister*'s killer tornadoes), acknowledges the difficulty of re-creating water, which has traditionally been one of the hardest things to do in visual effects. "It's definitely the most challenging thing I've ever attempted," he asserts. "Of course, it's not a calm sea, so aside from the big, rolling waves, we had to create the little capillaries, the 2- to 3-foot waves that build on top of those 80-foot waves, and beyond that, all of the white [froth] had to be simulated.

Photos courtesy of Warner Bros.

We couldn't just take static textures and slap them on our waves. Everything had to move with the ocean, which made it very difficult. It was a very heavy-duty technology show [that required] an incredibly large crew. The film is extremely detail-oriented."

Because Petersen demanded reality, Fangmeier and company began by studying reference footage of real storms, which they found somewhat underwhelming — "especially looking down on the ocean," Fangmeier says. "We looked at a lot of documentary footage shot from helicopters of 60-foot waves, and they don't look like anything! You're kind of wondering, 'Why are these people trying to get rescued off their sailboat?' We realized that to give the impression of those raging seas in every shot, our digital waves would have to be a bit over-the-top."

Enter John Anderson, a former professor of atmospheric and oceanic sciences at University of Wisconsin-Madison, who has become ILM's resident mad scientist in the areas of procedural effects and simulations, which he calls "sims." Anderson might have felt like a fish out of water when he helped create the layers of interrelating geometry that brought *The Mummy* to life, but on *The Perfect Storm*, he was truly in his element. "I've been doing computational oceanography and computational meteorology since 1980," he says. "[Back then] I was learning a lot about ocean dynamics using simulations that looked pretty much like a lava lamp! But for *The Perfect Storm*, we needed to provide a flow that looked good, which gave me an opportunity to go back and look at some numerical methods I'd never used. I thought they had limitations for scientific uses, but they were always interesting visually."

Anderson's familiarity with computational fluid dynamics, a numerical weather-forecasting technology, led to a fascinating paradigm on *The Perfect Storm*, where the weather-predicting system evolved into weather-creating effects protocols. "Fortunately, we are just getting into the era of being able to create 3-D simulation that you might confuse with reality," he says. "We then had to figure out how to control those sims and make 300 shots, which is always the trick."

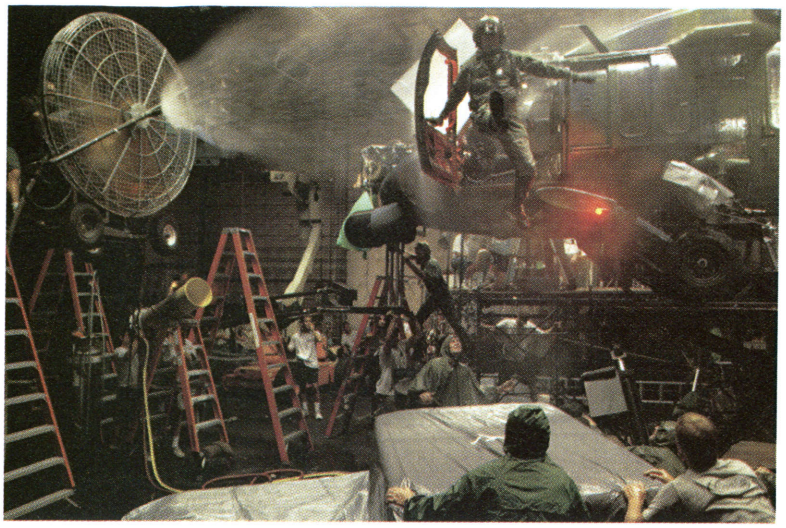
Fortunately, fluid dynamics would become a huge time-saving device, because ILM's artists wouldn't need to animate waves by hand, which would have taken forever and would never look quite as right as a good simulation. "With fluid dynamics, we didn't have to spend any time animating base water," Anderson says. "Instead, we ran a whole bunch of oceans, quasi-physically, to make different-height waves, different-spaced waves, things like that. We made about 60 large-scale water sims, but we probably used 15 or 20. Then the animation crew did what we called ocean scouting, where they looked through the simulations we'd run, trying to find a good one to put into a





Opposite page: The *Andrea Gail* attempts to crest a monster wave created digitally by ILM. This page, top: Within Stage 16 at Warner Bros., crew members employ more traditional special effects, hosing down a sloop to create the illusion of a stormy sea. Below: An overhead light is used to simulate the search beam of a rescue helicopter.

Making Waves



A high-powered fan blasts a sheet of "rain" at a stuntman leaping from a prop helicopter on stage.

particular shot."

In keeping with his epic tale of man's hubris in the face of nature's wrath, Petersen very deliberately invoked an Old Testament spirit in his characterization of *The Perfect Storm*. "It's kind of like there's an angry God up there, getting back at mankind," Petersen says. "The story has a very biblical feel." The director wanted the storm to develop like any good villain throughout the course of the film, showing audiences more colors and nuances as its wrath grows. "About 35 minutes into the movie, we introduce the storm, which comes creeping up in the sky over Sable Island, behind our *Andrea Gail*," Petersen relates. "It's a bit like the first time you see the shark in *Jaws*, and it even has a special musical theme. From then on, it's a constant build of the storm's size and sound. As Junger describes in his book, based on [the 13-point Beaufort Scale, which ranges from 0-12], the storm starts at a 7, which is a moan; it next goes to an 8, which sounds like a shriek, then a 9, which is a scream, and so on, right off the scale. Twelve is the highest storm, which sounds like a thousand church organs. As you can imagine, the sound design works a lot to create the character, along with the growing knots of the wind and the musical theme; visually, of course, it's a constant build from the first 20-foot waves all the way up to waves in excess of 100 feet."

Of course, keeping sight of that goal would be a challenge for any filmmaker. "Like every director, Wolfgang has a tendency to want every shot to be bigger and scarier!" relates Fangmeier, who sometimes had to remind Petersen not to head too quickly into Stephen King territory. "I would say, 'Wait a minute, it can't be Jack Nicholson enraged right off the bat! Remember, it's still early on and we don't want to quite go for that character yet.' It's hard not to try and make every shot that we do as impressive as possible."

Directing the ocean was not only a huge challenge for Petersen, but also for ILM's artists. While the underlying water motion was essentially a free effect, altering the digital wave simulations even slightly on ILM's Silicon Graphics hard drives could cost a lot. "Fine-tuning the effects could be very challenging, and controlling them could sometimes be a struggle," Fangmeier admits. "If Wolfgang asked, 'Can you make the wave move a little slower?' or 'I want the wave to break on this frame,' that messed with the computational complexities of the simulation. The rules at work within the sim were not necessarily that interruptible or controllable. If we were lighting a creature, we could look at virtual lights around [it] and see 30 or 40 updates of the image a day. But with a sim that takes two or three hours to run, we could make maybe two or three takes a day, and then we'd have to nail it. We hoped that by the last take, the simulation would give us something that was workable."

Once Fangmeier's team had captured the proper character of the ocean for a given shot, they often faced the challenge of combining digital elements with live-action footage of the 72' *Andrea Gail* rolling on a giant gimbal surrounded by bluescreens in the 95-square-foot water tank that was modified for the production on Stage 16 at Warner Bros. "We had a fair number of shots where we had to integrate that boat and replace the water around it with CG water, because they couldn't really go very wide on either side of the boat in the tank, and the wave machines couldn't make more than two- or three-foot waves in there," Fangmeier states. "In order to expand it overall, we contributed a lot of those elements with our CG water and added a lot of background waves. Our shots created the opportunity to make the audience believe that the boat is out there on the ocean, and to provide that character with a scale."

Key to creating a believable ocean was the intense layering of ripples and other kinds of effects over the original, simulated base motion. "Once our ocean scouts found the proper, large-scale wave motion, the technical directors would layer another medium-scale sim on top of that simple, plastic surface," Anderson says. "They'd also add a bunch of little ripple fields, which were also physical simulations. On top of that, they'd add capillary ripples, which were procedural." Adds Fangmeier, "We used different procedural sculpting devices to get a sub-level of deformation in the ocean geometry, and we applied a lot of

tricks to make the water look like it was moving at the right speed. Again, it was all very mathematically based. We were not in there tweaking stuff by hand."

Although the animation of the waves was fairly procedural, the look of the ocean itself — its color, the whitecaps, and the way the briny foam creates a spiderweb-like texture — was created through a series of complex shaders and particle work. The challenge became much greater when ILM's artists had to match their work to real water in the live-action plates shot on Stage 16. Fangmeier explains, "The big drawback with the live-action water was that it was not as foamy as real salt water, which actually foams up because of the salt content; that foam turns white, which really gives seawater a distinctive character. Unfortunately, to create that effect in the tank, the practical-effects guys would have needed to add a foaming agent, which would have become a nightmare biologically, because they had to keep the water very clean and filtered so it wouldn't become a health hazard. Because the water was not as foamy as we would have liked, we had to walk a fine line in terms of matching the foam in the foreground elements, or often entirely replacing it. We used particle simulations to create the foamy splashes around the boat, as well as the boat's wake. We ended up using five or six different levels of particle simulations routinely, in almost every shot, to create the dynamics of everything coming off the water and ripping off the boat."

Fangmeier understood that the whitecaps coming off the digital waves were the key to creating believable stormy seas. "From the beginning, I knew those whitecaps would be the accent that would give audiences the feeling of how rough it really was out there," he says. "It's hard to tell how big the waves are until you see whitecaps, so the most

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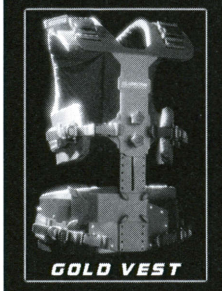
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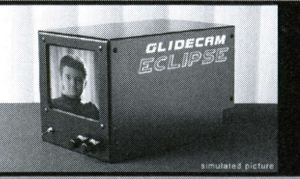
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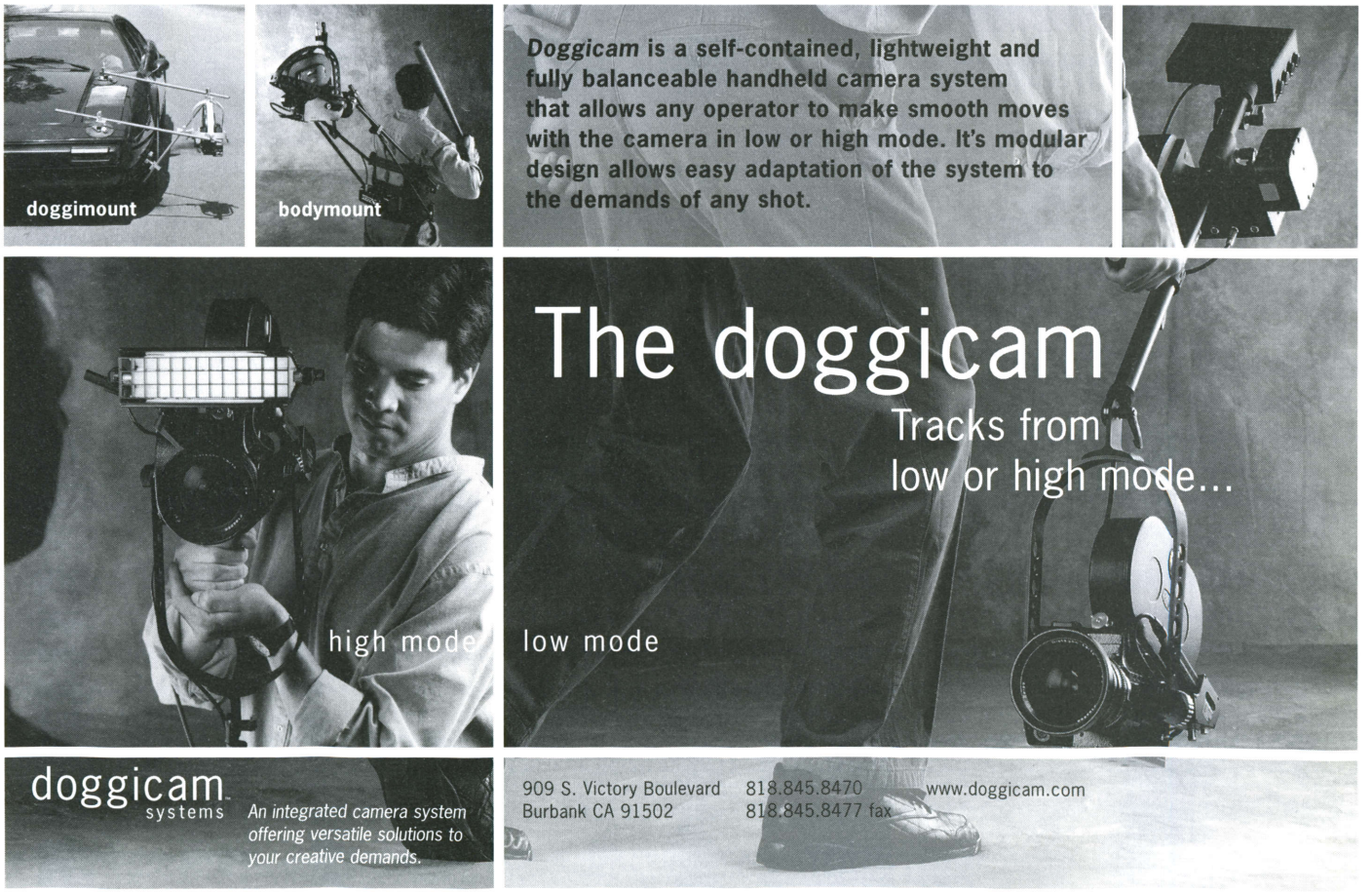
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important thing — and the most difficult — was getting that white stuff to look right. To get the whitecaps going, we emitted millions of particles on top of the water and made it fall along that deforming geometry."

Another key artifact was the way the wind ripped across the water, tossing spray in the air. "That kind of thing had to look very natural, because it's what gives the storm its character," Fangmeier notes. "It's like being in a canyon where 100 mile-per-hour winds come ripping through — you see some incredibly turbulent airflow behavior from the winds ripping across the bigger waves. Again, we used particle systems to create that effect. We'd look at the wave simulation for the shot and say, 'Okay, let's decide what kind of curvature this wave should have, and only emit particles from a certain portion of that curvature, since we only want the mist to blow off the top of the wave.' We'd add some random factors so the mist didn't emit evenly, then set the wind direction and the wind speed, perhaps adding some turbulence so the wind didn't just blow straight. It took a great number of iterations to get it to look right. Sometimes the particles coming off the waves would hang in the air too long, and instead of looking like mist or water getting ripped off, it began to look like smoke. The margin of error was so small!"

Once all the layers of wind, turbulence, mist, spray and foam effects were created, they had to be combined over one another and blended with the live-action plate. "They all had to live within the same environment," Fangmeier explains, "which meant that they had to interact with one another." Anderson emphasizes, "It looks so good because of the incredibly talented handcrafting done on top of the sims by our technical directors. We hung out a lot of physically based, underlying animation, but there's an awful lot of TD skill involved to make it all look right. It's very much a matter of building it up in layers."

One surprise was just how much work had to go into every shot, despite the procedural nature of the wave effects. "Everything was rather finicky," Fangmeier recalls. "We thought we'd invest a lot up front in doing research and developing the technology, and that after a while, it would become easier because we'd be doing the same ocean over and over. But every shot was quite a bit different. The ocean was a very difficult subject to photograph because it looked very different from every camera angle. Even the same parameters, from a different camera angle, didn't give us the same sense of



scale and speed of the wind and mist. We usually struggled quite a bit and had to rely on the Maya software to get that consistent feeling of huge waves across all the shots."

As difficult as it was to match CG water to live-action plates, the hardest shots in *The Perfect Storm* were actually those in which everything — the sea, the ship and the sky — was digital. "When the third act starts, the storm is at its full capacity," Petersen states. "It's apocalyptic, and it doesn't let go anymore." The same can be said for the director, who took full advantage of ILM's digital arsenal to create heretofore impossible shots in which the virtual camera literally rides the CG waves like a demon surfer amid the watery holocaust. "I told them, 'Let's give the audience the experience of what it means to ride these waves, and not just have static shots where you see the boat rise up,'" the director remembers. "'Let's move the camera. Let's ride the waves and just go with it.'"

But how could ILM balance that aspect of the work with the absolute reality of the true story being retold in Petersen's film? Anyone who has seen the film's poster art, wherein the *Andrea Gail* is dwarfed by a wave of biblical proportions, knows the answer: sometimes epic imagination is more real than reality. "We're taking a lot of artistic license, just as we did with the tornadoes [in *Twister*]," Fangmeier admits. "The storm is a significant character in the story, and its character is defined by what it's tossing around, and how it's treating the boats. Because of the scale of those scenes, we did quite a number of entirely CG shots, and we built a range of digital models and integrated them into different situations.

"We must have built half a dozen CG ships — everything from a sailboat to a 200-foot Coast Guard cutter to a cargo ship — to show how even big boats were in peril. Plus, [let's not forget] the refueling plane and, of course, the *Andrea Gail*. We also made at least a dozen digital stunt guys for all of the characters on the boat, as well as the helicopter pilots and rescue swimmers. When we're dealing with these epic shots, we'll occasionally break some rules to come up with an exciting shot."

That strategy paid off brilliantly. "I knew when I read the script that the barrage of being in that storm would make this a stressful movie to watch," Fangmeier says, "I don't think Wolfgang left anything to chance in terms of how something was going to be perceived and how it would work. Because the reality the film needed was very minutely crafted, he certainly challenged us. He said, 'I know that this is very hard, but I think the film needs it!' So we went for it!" ■



Matte Painting's Monet

The late Albert Whitlock was one of movie history's most skilled illusionists.

by Ray Zone

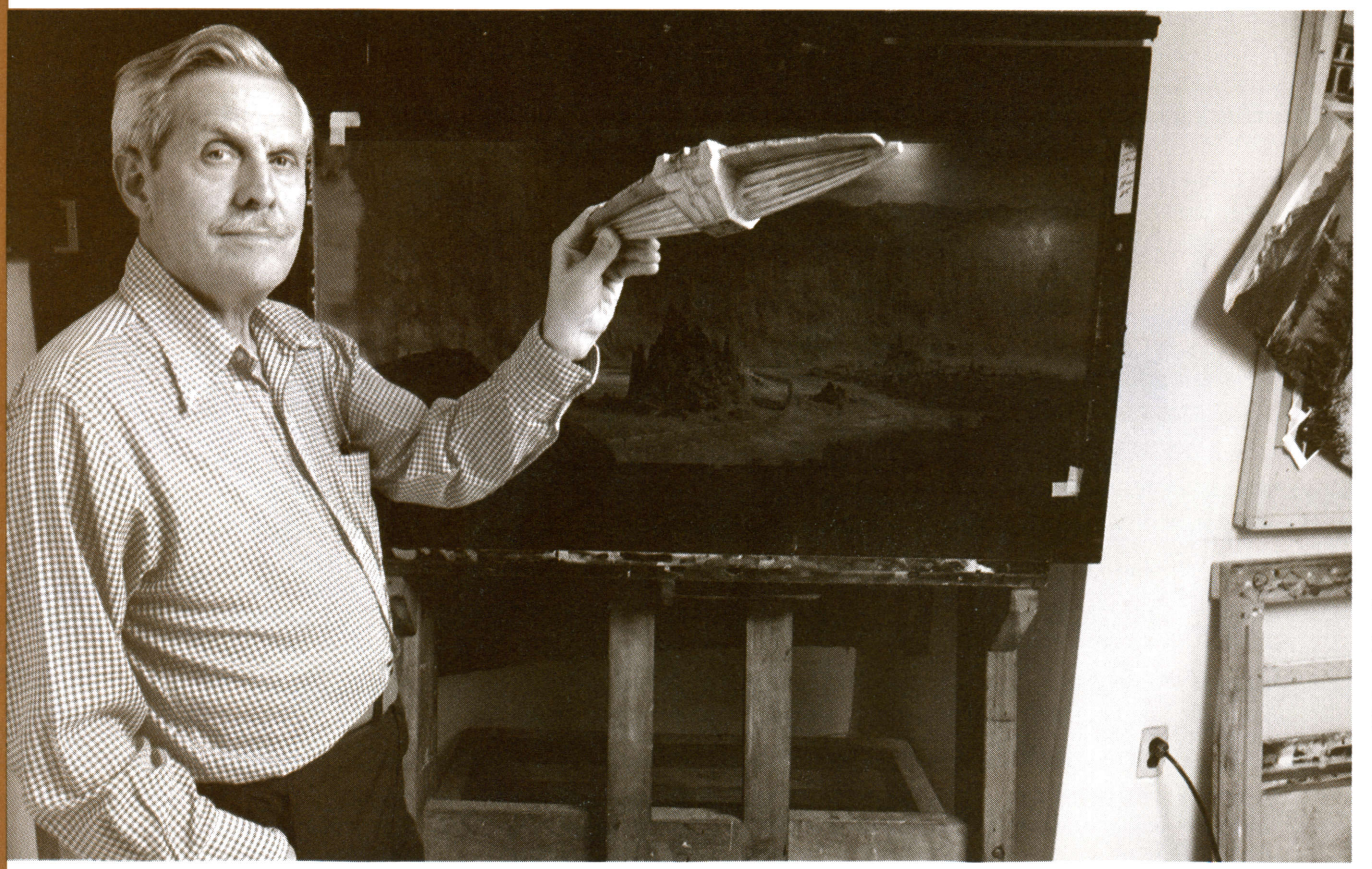


Photo on this page by Bill Nation. All photos courtesy of Universal Studios.

In a recent interview, director Robert Wise recalled accepting the assignment from Universal Studios to direct the 1975 film *The Hindenburg*. "My biggest problem was, could I make it work?" he said. "Before I accepted the assignment I had a meeting with Al Whitlock, a matte-painting specialist at Universal. I said, 'Al, can we do this? Can we show that giant aircraft outside the hangar in Frankfurt? Can we get her up in the air? Can we fly it across the ocean? Can we take it around by New York? Can we bring it into its hangar in New Jersey?' He said, 'Yeah,' and started to talk about how we could do it... Then I went back [to the studio head] and said I would do it. I wanted to clear it with [Whitlock first]."

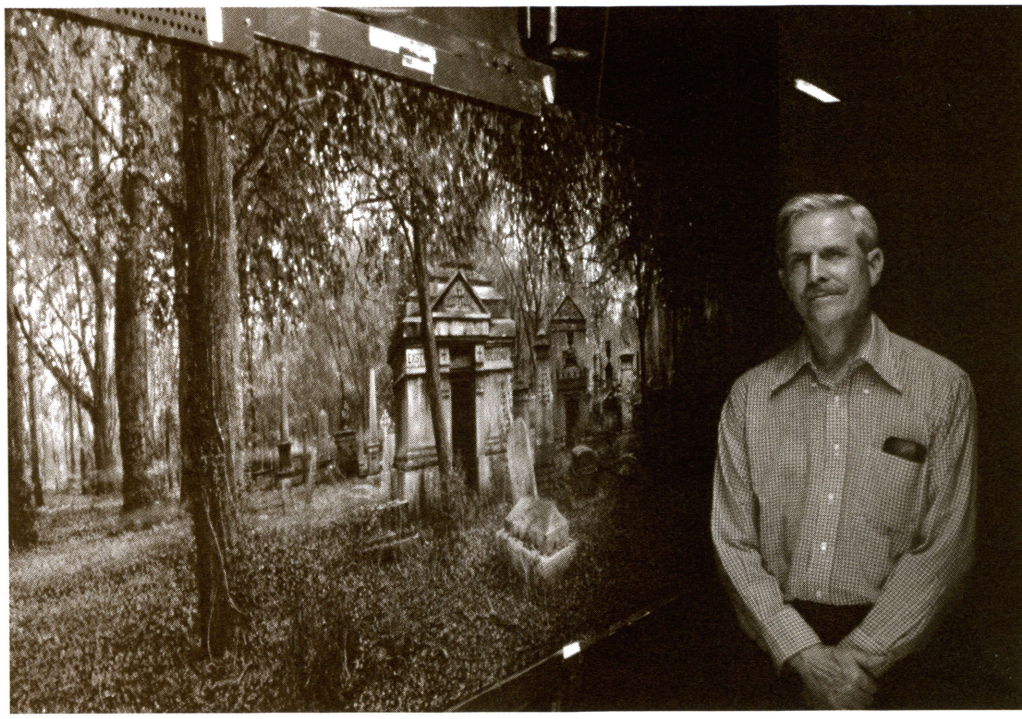
Wise was well-advised to seek Whitlock's advice before accepting the project. For over a quarter of a century, from the early 1960s to the mid 1980s, Whitlock was the acknowledged master of matte

painting in motion pictures, and his mastery of the discipline was unparalleled in the industry. Whitlock was able to seamlessly integrate his paintings with live-action photography, creating scenes that would have been impossible to construct in three-dimensional reality and saving producers and studios millions of dollars in costly set construction. His cinematic magic is seen but generally not noticed in more than 500 films and television shows, including *The Birds* (1963), *Tobruk* (1967), *The Sting* (1973), *Funny Lady* (1975), *The Day of the Locust* (1975), *Bound for Glory* (1976) and *The Blues Brothers* (1980).

In 1974, Whitlock won an Academy Award for his special visual effects work on *Earthquake*, and he won the same award the following year for *The Hindenburg*. Throughout his 50-year career, the unassuming Whitlock always referred to himself as a craftsman rather than an artist; he continually tried to demystify his work, stating that his craft was something that could be learned by anybody willing to make the effort.

Whitlock himself gave us the best capsule description of a matte shot in a 1974 *Herald Examiner* interview: "In simple terms, a matte shot is a need for an image that doesn't exist. It doesn't exist because either it's too expensive to go shoot it, or it's too expensive to manufacture by other means. What you do in effect is block out an area of a scene into which you put a painting. Now, my claim to fame is that I do that on the original negative instead of copying the film in order to do it, and I have all sorts of moving clouds and things that give it more life."

Bill Taylor, who was Whitlock's matte cameraman from 1974 to 1984, says, "What was emblematic of Al Whitlock was that the quality of the pictorial result was the most important thing. He devised very careful procedures that all but took the risk out of many of the shots done on original negative. He created very complex animations on original negative that would have been daunting even on dupe shots."



Syd Dutton, who was a painter assistant to Whitlock for many years, is Taylor's partner at Illusion Arts, a Los Angeles company that produces special effects for motion pictures and television. "Al taught me everything I know," Dutton says. "He would always quote the painter Constable, who said, 'The sky is an organ of sentiment.' I remember one beautiful landscape Al painted that was supposed to be a whole bunch of weeds, chaparral in California. When I looked at it up close, it looked like Persian writing — just squiggles — but when you stood back, it looked just like chaparral. Al always said, 'Paint is the effect of light, not the object itself.'"

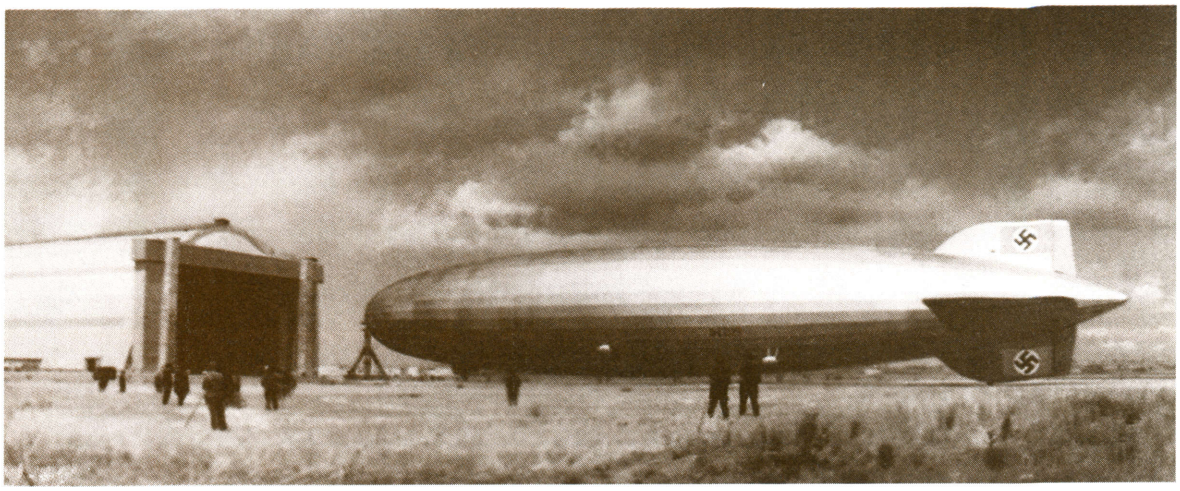
One could easily mistake Whitlock's paintings for the work of an accomplished salon artist, except for the fact that they were painted on glass or plastic. They were painted for the eye of the camera rather than that of the beholder, made to fit the live-action footage that had been previously captured on film. The genre in which he created most of his paintings was the landscape, and if you were to place him within a particular school, it could be that of Impressionism.

In a November 1974 article for *AC* about his effects work on *Earthquake*, Whitlock characterized his style as "very close to French Impressionism, strange as that may seem. It's much more like that than like academic painting. If you look at one of these paintings very closely, you will note that it's not that carefully painted. With frequently only five hours to do a complete painting, I don't have the time to do a highly finished job, but I've found out through experience that this isn't necessary in order to get the result."

For *Earthquake*, Whitlock had 12 weeks to complete paintings for 40 different scenes. Working closely with director Mark Robson, Whitlock insisted on creating the effects on original negative that was of exactly the same technical quality as that used to film the live action. He had a very keen sense of the audi-

Opposite page: Albert Whitlock demonstrates how a miniature spacecraft will soar through one of his matte paintings for the 1984 sci-fi epic *Dune*, directed by David Lynch and photographed by Freddie Francis, BSC. This page: Whitlock stands next to his panoramic painting of a graveyard for the 1981 horror film *Ghost Story*, directed by John Irvin with cinematography by Jack Cardiff, BSC.

Matte Painting's Monet



Whitlock's mastery was shown off to impressive effect in *The Hindenburg* (1975), directed by Robert Wise and photographed by Robert Surtees, ASC. The results earned the artist an Academy Award for special visual effects

ence's visual sophistication. In composing the matte-painting shot, the live-action inset was always shot first, and Whitlock was always on the set when it was being filmed. With the area that was to be painted blacked out, only the live-action area was recorded on the first pass through the camera. Being there during filming gave Whitlock "the opportunity to visualize the complete final scene," and the assurance of creating a workable composition.

Whitlock also worked very closely with the director of photography in order to make his paintings match the rest of the picture. When shooting the painting later, he always worked with the same f-stop used to film the live action. That way, the density of the two elements matched. This kind of precision required shooting 200 or 300 feet of test footage with the matte in; typically, Whitlock would not get too far into the complete painting before making the first test shot. With the composition roughed in, he could make his first determinations on key lighting, which he found critical. If the original live-action exposure was a bit low, he would paint the matte on the low side so it would have the same look.

"In shooting the paintings," Whitlock wrote, "I always work to a set lighting. If my first test indicates that the painting is too light or too dark, I make a radical change right then in the key of the painting. However, if you get too much done on the painting [fall in love with it, so to speak] before you make your first test, and it turns out to be the wrong key, you can be in trouble."

When the printing lights on the original photography came back, Whitlock knew whether or not it was in the middle of the scale. If it was, "I have a pretty good idea of what kind of painting I have to do," he wrote. "Making such judgments is something instinctive, a kind of 'feel' you acquire after long experience."

Because Whitlock always worked with the original negative of the live action, it was neither developed nor printed after being shot. It was brought back to the studio and kept in a refrigerator because it would not be completed until the painting was also exposed onto it. When the original scene was shot, it was common practice to set up a B-camera to cover a duplicate of the action so that the editor would have something to work with while the painting was being shot to complete the scene.

As Whitlock's matte cameraman, Taylor was responsible for ensuring the safety of the original negative. "When you're working on original negative, you can't afford to have a mechanical failure," Taylor emphasizes. "We always had very rigorous procedures. For example, we would always do a hand test, trim a little piece of film from the head end of the take with film still threaded in the camera and develop that into black-and-white so we could see the painting double-exposed onto the live action. We could see that there wasn't any dirt on the frame line that visibly flew into the frame during the take, and we could see whether the split screens were working."

Whitlock shot his test footage with the matte painting in, and then without the matte. When the test came back with its printing lights, he knew whether the matte was printing high or low. By shooting without the matte, he could see the whole scene as it was and take his key from the piece without the matte. This method also gave him a source-light direction. There were always objects in a scene that cast shadows, and he could duplicate those shadow angles in his painting.

While a knowledge of photography was vital to his work, Whitlock did not delve too deeply into that subject. "If I want something shot in a certain way," he wrote, "I might say to the cameraman, 'Give me high contrast and good speed.' I know the potential of film and the requirements thereof, and I leave it at that."

Whitlock's long career in the motion-picture industry began in London in 1929, when, at the age of 14, he began working as a "fetch-and-carry fellow." He built sets and scenery and worked as a grip. Trained as a sign painter, Whitlock began a career-long association with Alfred Hitchcock by doing all of the signs for *The 39 Steps* (1935), after first assisting the miniatures expert on the director's *The Man Who Knew Too Much* (1934).

Those experiences were the foundation of a close personal and professional relationship between Whitlock and the director. Hitchcock was one of the artist's biggest fans and utilized his talents on many features, including *The Birds*, *Marnie* (1964), *Torn Curtain* (1966), *Topaz* (1969) and *Family Plot* (1976). Whitlock recalled Hitchcock as one of a very few directors who could accurately explain the type of special effect he wanted in every picture. No special effect was ever created for a Hitchcock film unless it served to move the story along. "His understanding of these techniques was really much more profound than [that of] most movie makers," said Whitlock.

It was during World War II that Whitlock moved into doing matte work. The first glass shot he received full credit for was a ballroom scene that appeared in *The Bad Lord Byron* (1951). During these years, Whitlock apprenticed alongside artist Peter Ellenshaw under a matte painter named Pop Day, whom he characterized as "a better artist than any of us." Day was inclined to make his paintings too detailed, and the mattes drew attention to themselves. As a result of working with him, Whitlock gradually arrived at his philosophy that the painting should ideally not be noticed by viewers.

After moving to the United States in 1954, Whitlock began working for Walt Disney Studios, where his first job was designing the titles for *20,000 Leagues Under the Sea*. Ellenshaw had preceded him to Disney and had taken charge of the matte department, where he did much to advance the art of matte painting. He had a great influence on Whitlock, using a broad approach in creating imagery that would convey a general effect. He did this by building essential details into a design that was almost abstract.

Whitlock became one of the most proficient artists at Disney and successfully mastered his impressionistic technique there. He remained at Disney for seven years, and in addition to working on many films, he was involved in the design of Disneyland.

In 1961, Whitlock moved to Universal Studios, where he headed up the matte-painting department. While there, he expanded the importance of matte painting and demonstrated increasing sophistication with special effects. He also saved the studio thousands of dollars that it might have otherwise spent in production. For example, Whitlock's special effects on the $10 million feature *The Hindenburg* cost just $180,000. (By comparison, Paramount spent more than $20 million for the special effects on *Star Trek: The Motion Picture* four years later.) When Universal produced *The Blues Brothers*, whose budget ballooned to $40 million, Whitlock spent just $20,000 in order to blow up a Chicago hotel; his version of the hotel was made of cardboard and was destroyed using compressed air. Had a real hotel been destroyed, the cost to the studio would have been around $600,000.

Ultimately, none of the other studios retained their matte departments, so Universal frequently loaned out Whitlock and his staff of eight, even though they were under exclusive contract. While working for Paramount with director of photography Conrad Hall, ASC,

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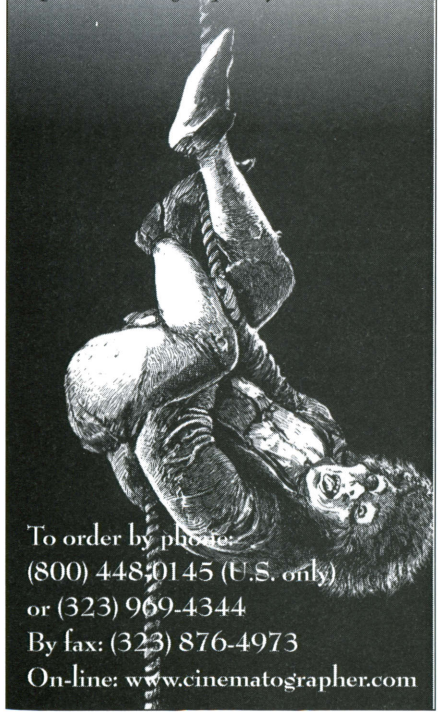
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Matte Painting's Monet

Whitlock produced matte paintings for the climactic scenes of *The Day of the Locust*. "We used three cameras when we had the largest crowds of extras, and two cameras when we had fewer people," Hall wrote in the June 1975 issue of *AC*. "Al Whitlock filled in around our longest shots with matte paintings in order to provide a context of the old Hollywood, which would have been impossible to achieve any other way. I think it's a terrific sequence. It's so real."

One of the finest special effects Whitlock ever created was the dust-storm sequence in *Bound for Glory*. The storm was created in Whitlock's studio with three large balls of cotton, mounted on cardboard and dyed to the color of the dust that had been blown over actors in previous shots. The cotton balls were rotated at different speeds, with a separate matte made for each one. Portions of each matte were half-exposed, once with dust moving toward the camera and once with it moving away from the camera, to produce the effect of eddying dust. A blue sky was exposed and allowed to "ghost" through the dust in different areas. The stunning result took weeks to achieve and lasted for exactly 7 seconds of screen time — 10 feet of film.

Another stunning effects shot Whitlock created was a skyline of 1930s Chicago for *The Sting*. The skyline incorporated an elevated train, which provided the noise that awakened Robert Redford's character in the morning. The lower live-action part of the picture included traffic, buses and pedestrians. Director George Roy Hill called the shot "one of the best in the film." Whitlock felt it was an economical way to tell the story in that it opened the sequence and established both the time of day and the setting.

In 1977, Whitlock received the Pioneer in Film Award from the University of Southern California's Delta Kappa Alpha cinema fraternity. On hand to present the award to his associate of 40 years was Hitchcock. "There is no question," the director said, "that he is by far the finest technician we have in our business today."

In January of 1982, Whitlock presented a day-long seminar on the art of matte painting at the Academy of Motion Picture Arts and Sciences. It was a rare opportunity for film buffs and students of special effects to learn techniques directly from the master. Both Taylor and Dutton joined him at the seminar. Others who served under Whitlock in the matte-painting department at Universal, including camera assistant Mike Moramarco, grip Henry Schoessler, rotoscoper Susan Rodgers, assistant painter Larry Shuler and Mark Whitlock, Al's son, were also present.

Whitlock retired from Universal in 1985. Among his last films were Hugh Hudson's *Greystoke: The Legend of Tarzan, Lord of the Apes* (1984) and David Lynch's *Dune* (1984). Speaking from his office at the studio, Whitlock said, "The last scene in *Greystoke* — the jungle with a volcano in the distance — was totally manufactured here."

Whitlock died in October of 1999. A former governor of the AMPAS and an associate member of the ASC, he was truly unique — a master painter with the precise mind of a photographer. He would paint in f-stops and light his images according to the key lights and fill of the original photography — the kinds of computations that are done today by highly complex computer software. Whitlock made such calculations in his head, and he knew what would work on the screen. "Hopefully, the camera does lie," Whitlock said, "because it's looking at a painting that we are trying to convince people is the real thing." ■

Short Takes

A Master of Moods and Monsters of Rock

The Timeless Timex
by Stephanie Argy

At the end of February, cinematographer Barry Peterson traveled to Prague with director Tim Burton to shoot a pair of Timex commercials. One spot stars a man, the other a woman, and they both battle what Peterson calls "scary, spooky, Tim Burton-type characters. Also, they're a little bit *Matrix*-y, in that there are a lot of fight sequences and people on cables."

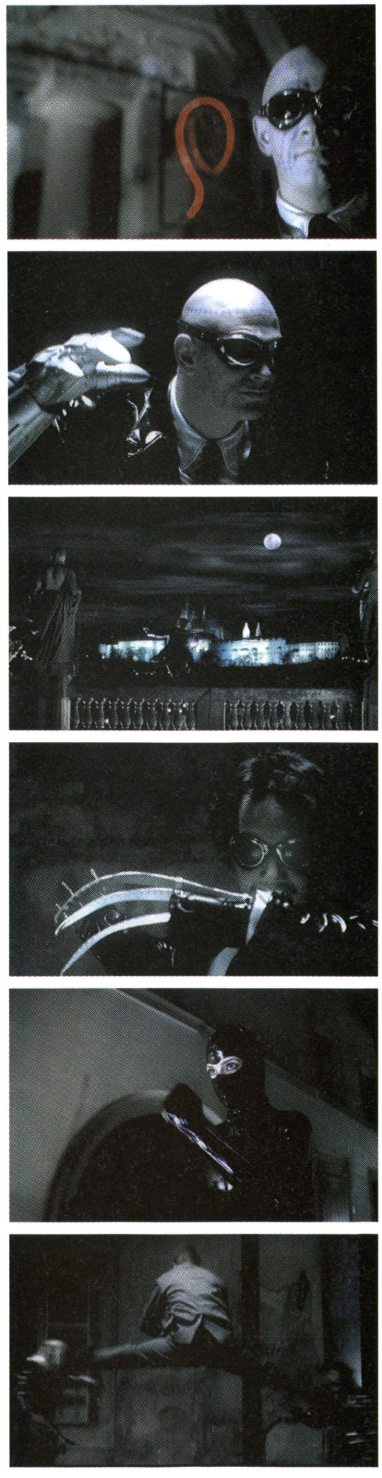
Peterson shot Burton's only other commercial, a Hollywood Gum spot he directed just before last year's *Sleepy Hollow*. "We got introduced through A Band Apart," he recalls. "Working with Tim is an incredible pleasure. His instincts about characters, what will look great and what will tell a story are just amazing."

Accustomed to the longer preproduction schedules of the feature-film world, Burton brought Peterson onto the Timex ads sooner than is usually the case with commercials, and the duo looked at photographs and discussed stylistic approaches and possible locations for the shoot. "He's used to having a director of photography involved a bit earlier," says Peterson. "Typically, I show up two days before the shoot and they say, 'This is where we're going to be shooting, and this is what we're going to be shooting.'"

Visual-effects supervisor Jerry Spivack of Ring of Fire also participated in early discussions, explaining what the facility would need in each shot, as well as processes and plans. "When they started doing the rehearsals and coordination of stunts, we also got involved with that," says Spivack. Because much of the company's work on the spot involved wire removal, he advised the spot's wardrobe department about the design of the harnesses the performers would wear. Several designs were used, many with different "pick areas" — some lifted the actors from the back, others from the side. "There are a lot of little things you put into preproduction," says Spivack, noting that the crew had to make sure the costumes wouldn't appear to be too "pulled" as the actors were hoisted into the air.

In lighting the spots, Burton and Peterson decided to go with a soft, overhead, moonlit feel, especially for the actual fight areas. A softbox over the performers gave Peterson and Burton the ability to move quickly and execute circular dolly tracks while keeping the light on the performers "moody," no matter where they stood. To get that look, Peterson used four 10Ks and a muslin softbox on a Condor. "We actually had the whole system on a dimmer so we could change the color temperature and make it a bit warmer," he says. Farther down the street, in the background, Peterson used Condors with 10Ks and Maxi-Brutes to create pools of light that enhanced Prague's 15th-century cobblestone streets. "It wound up looking as if every bit of [the location] was designed, but honestly, it was just there," he admits.

Noting that Prague is one of the few European cities that was not



Tim Burton's signature visual style is evident in his moody, Gothic ads for Timex, titled "Mannequin" and "Kung Fu." The spots were produced by A Band Apart, with visual effects by the West Hollywood facility Ring of Fire.

Photos courtesy of Hype.



Cinematographer Barry Peterson says that he benefitted from the extra prep time he was able to spend with Burton.

bombed out during World War II, Peterson describes it as "an incredibly beautiful place," but not the easiest place to work. "There's still quite a bit of red tape in the Czech Republic," he remarks, adding that working out permits took quite a bit of effort. He also discovered that whereas lighting gear in Prague is very well-maintained, the grip equipment is another matter. "I was shocked by the lack of grip equipment," Peterson offers. Instead of 4' x 4' flags, for instance, the grips used sheets of Styrofoam that were painted black on one side. "Supposedly, that's how they usually work!" the cinematographer exclaims.

Another dilemma was that experienced crews are at a premium in Prague, because so many productions are going there. "There's probably a bit more production than expertise," says Peterson. "A-players disappear quite quickly." He brought along a British camera crew because he couldn't find a Czech camera crew that had worked with Panavision cameras, which both he and Burton favor. "Tim has only shot with Panavision equipment, and I shoot with Panavision on all of the commercial stuff I do," says Peterson. "I ended up using a Panavision Platinum and Panastar that we got from London." He shot with Primo prime lenses, mainly wide-angles.

Because both spots are set at night, Peterson used Kodak Vision 500T 5279 for most of the work. He also employed 5289, Kodak's 800-speed stock, for a few shots. "There are a couple of broad shots on top of a building, and we wanted to use the available light," Peterson details. "We needed a bit of depth because there was a lot of running stuff, and we wanted to dig into the blacks more." Spivack says the choice of stocks really didn't matter that much in terms of the effects work: "Once you create an overall look, which Barry and Tim did, all I'm concerned about is whether I can stay in that arena. In those terms, [the spot] didn't really pose any particular challenges."

During the shoot, Peterson used little filtration. "We kept a lot of it very clean," he says. "I primarily used ND grads for knocking down tops of buildings, and a few vignette grads. The diffusion I used was primarily smoke — I had some good smoke guys." Peterson attests that there's an art to using smoke. "The longer the lens you're using, the lighter you've got to keep the smoke; that's definitely part of the trick for consistency."

According to Peterson, Burton does a lot of work ahead of time to develop a vision for his projects, but he also remains very flexible on set and willing to rearrange his thinking as necessary. "I know he has conversations very early on with a storyboard artist he works with on all of his films, but Tim uses boards as a template more than anything."

The cinematographer adds that when Burton discusses shots and lens selection, he talks in a broad sense about what he's looking for and where and how he wants to build tension. "Part of what he does is let you into the whole process of the design of the photography. He opens the door to cinematographers."

Although Peterson says Spivack accompanied the crew to Prague "as a failsafe, to make sure we didn't hurt him later," Peterson's own knowledge of visual effects is quite extensive. "My background was as an effects cinematographer," he says, recalling that in his youth, he ran around with a Super-8 camera and was then seduced by the effects frenzy that followed *Star Wars*. He worked at a series of effects houses during the pre-digital era, learning "the bluescreen, the motion-control and the patience. When we were doing effects, we had a computer, but it was used for motion-control only. When we'd shoot a bluescreen, it would go into an optical printer."

Peterson says that his experience with effects has been beneficial. "I think it has opened some doors, and people understand that when I say, 'Don't worry about this, it's not going to be a problem,' I've got [the knowledge] to substantiate it." He adds that filmmakers now have a lot more latitude because of modern digital tools, such as those used by Ring of Fire on the Timex spots.

To remove the wires that were visible in the principal photography, the effects artists used a Discreet Logic Inferno; for morphing, they used Elastic Reality, and to composite it all together, they employed a Quantel Henry. "We also did a lot of watch enhancement," says Spivack. "This is a spot for Timex, so each watch shot needed to be a beauty shot." In addition to brightening up some of the watch faces, the artists also reset the times on them so that they would make sense in the flow of the commercial.

The company's team of 13-14 artists had three weeks to turn around the spots, which ultimately comprised not only two 30-second spots, but also two 60-second spots intended for theatrical exhibition. According to Spivack, the fact that two of the spots would be shown theatrically meant that there were a few extra details to worry about, including the aspect ratio. "They made an early decision that even the spots on television would be 1.85:1," he notes. Everything was shot at either 24 or 48 frames per second, which Spivack says makes the blow-up to 35mm go more smoothly.

Peterson says he loves the diversity of commercial work, which enables him to ply his trade in many different places and situations. He also enjoys the benefits of modern technology. "I think we're actually at a pretty great time, utilizing the combination of film and digital techniques," says Peterson.

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"It allows for people to be creative a bit more quickly."

Bad Boys
by Graham Rae

"Revolution Is My Name," the latest music video by the platinum-selling heavy-metal act Pantera (from the album *Reinventing the Steel*) details the sonic evolution of the band, tracking its journey from the primordial soundswamp to its current status as one of the world's most revered rock 'n' roll bands.

The video shows the band members receiving their first musical totems as kids: singer Phil Anselmo gets an album of horror-show tunes, *Monster Mash;* bass player Rex Brown receives *Led Zeppelin III;* guitarist Dimebag Darrell is given a Washburn guitar; and drummer Vinnie Paul gets an album by The Fandangos. The band is then seen growing up in the 1970s, '80s and '90s, finally reaching the top of the industry totem pole with "Revolution Is My Name." Intercut with shots of each member's musical heroes is footage of epoch-shaping world events from those decades. The video ultimately presents a gleeful documentation of the Pantera family tree, as well as a celebration of the band's rabid fan base.

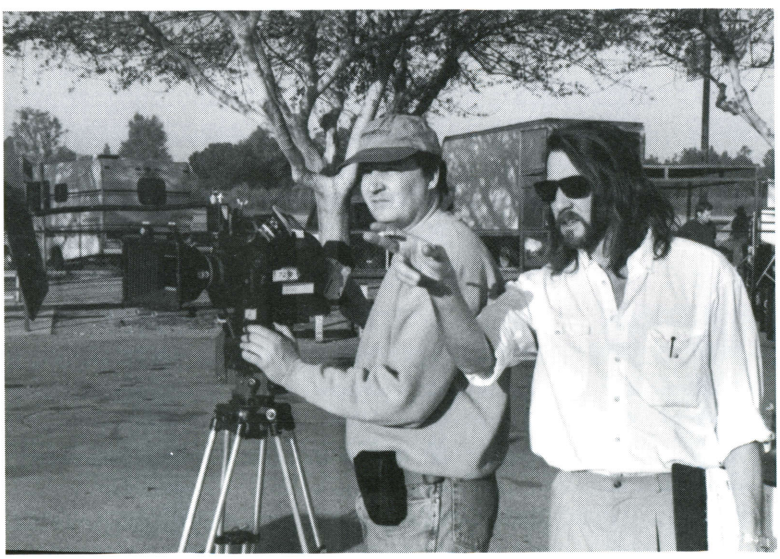
This intimate portrait of the band is the work of director Jim VanBebber and cinematographer Mike King, who have known each other for about 17 years. The Ohio natives met as students in Wright State University's film program, where they studied under documentary filmmakers James Klein and Julia Reichert, who have twice been nominated for Academy Awards (*Union Maids, Seeing Red*).

After graduation, VanBebber, King and classmate Marcelo Games formed Mercury Films and began making a series of 16mm films. King photographed most of them and directed the documentary *Doper;* he has also worked on a raft of low-budget features, commercials, training videos and documentaries. VanBebber has directed the video "Spasmolytic" for the industrial band Skinny Puppy, as well as several shorts for Mercury (among them *Roadkill: The Last Days of John Martin, My Sweet Satan,* and the trailer for a film called *Chunkblower* that never got past the script stage). He has also directed two features, both photographed by King: the gritty, visceral, much-lauded *Deadbeat at Dawn,* and the docudrama *Charlie's Family,* an unromanticized view of the Manson family and its terrible crimes.

Charlie's Family took 10 years to complete and now sits on a shelf for want of postproduction financing. The film has attained legendary status in the world of American underground film, and an illustrated edition of the script has been released by Creation Books in both the U.S. and U.K. VanBebber describes this process as "the most back-asswards way to make a movie that can be imagined."

It was, in fact, partly due to *Charlie's Family* that the filmmakers landed the Pantera video. Anselmo had been a fan of VanBebber's work for a few years before filmmaker Buddy Giovinazzo (*Combat Shock*) introduced the two in 1994. Both big horror-film fans, they spent a while complaining about the state of the art before VanBebber (who says he is "a dead dyed-in-the-wool Pantera fan") offered to show the rocker a rough cut of his Manson family album. Anselmo loved it and invested some money in it before





Top: Displaying his keen grasp of the rock 'n' roll dress code, director Jim VanBebber (in headband) plots out a shot with the members of Pantera. Bottom: Manning the camera, cinematographer Mike King takes his cue from VanBebber.

Photos courtesy of Scott F. Calvia and Jim VanBebber.





King prepares to execute a dolly move that will glide past the band.

inviting VanBebber out on the road with Pantera on its fall 1996 tour.

Using his own money, VanBebber shot five rolls of Super-8 footage from the stage, then did the same on the band's 1997 tour. Some of this footage ended up in the "Revolution Is My Name" video; the rest will go into Dimebag Darrell's Pantera video archive, which includes footage of the band from as far back as 1988.

When VanBebber was asked to direct the video, the band members discussed what it would be about, and VanBebber and King developed storyboards. The video uses grainy, '70s-style footage to show the members as kids — young boys wearing fake beards to represent their older personas — then tracks them into their teen years. The pre-Pantera boys jump around their respective kitchens and poster-decorated bedrooms to metal riffs — drumming, singing and playing air guitar, and generally having a fine old playtime. We finally see the modern-day Pantera playing in a warehouse, still clearly having a good time.

The filmmakers shot with two separate crews in Los Angeles and New Orleans. King and VanBebber had only two days to shoot and limited funds, but they brought the video in on time and on budget. The young actors playing the band members as boys were shot on several small sets built on a stage in L.A. This 16mm footage was shot with King's own Arriflex 16SR on Kodak 7240 rever-

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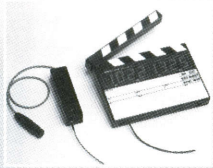
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sal tungsten stock, an emulsion the filmmakers had previously used on *Deadbeat at Dawn*. "I like working with that stock for period footage," notes King, who says he's been influenced most by the work of Owen Roizman, ASC (*The Exorcist, The French Connection*) and Raoul Coutard, who shot most of Jean-Luc Godard's work. "I've [also] used [the 7240] to do some historical reenactments for commercials."

King tried to use color differently in each boy's room to reflect their personalities. He used tungsten lighting, with hard light coming through set windows, wherever possible.

Contemporary footage of Pantera was shot in a New Orleans warehouse that the band owns and uses for rehearsals. VanBebber says he talked the band into shooting there because he thought playing with concrete underfoot said more about their down-to-earth personalities than a soundstage ever could. The warehouse scenes were photographed with an Arriflex 35-III equipped with both a Cooke 18-100mm zoom lens and an Angenieux 200mm telephoto lens. "We used a zoom because we only had one night, we were always on a crane or a dolly, and we had to shoot fast," says King. "We didn't have any prime lenses because we wouldn't have had time to change them. We chose that camera because it was the least expensive one that would suit our needs. Budget was an issue, but it was a really good camera package."

King used Kodak's Vision 200T 5274 stock for the warehouse footage. "I wanted to go with the slowest film stock I could to get a really nice-looking grain structure, so I stayed away from the higher-speed stock," says the cinematographer. "I think Kodak's grain structure is superior, as are the stocks' blacks and color rendition."

King wanted the warehouse footage to reflect a "kinder and gentler" Pantera. "We wanted the blend to be a bit softer and warmer. We were going for the warehouse look, but we didn't want the look to be dark, shadowy and moody. We wanted to show these guys straight up, without trying to put a lot of edge on it." Because the warehouse had a limited power supply, the filmmakers used a 10K Fresnel aimed through a silk and ¼ CTO. For a fill, King ran two 5Ks through another silk and ¼ CTO, then hung 2K Juniors with lighter, cooler colors as backlights.

"The idea was to make the lighting more high-key, almost a little bit more flat than you would get in a normal video," King notes, adding that his approach was a compromise. "We were trying to show the band in a natural, friendlier setting, [but at the same time] we needed to light up a big area. That required a lighting setup that we could build and leave throughout the whole shoot." The cinematographer used a ½ Black ProMist for filtration to soften the band up just a touch without the diffusion being too noticeable.

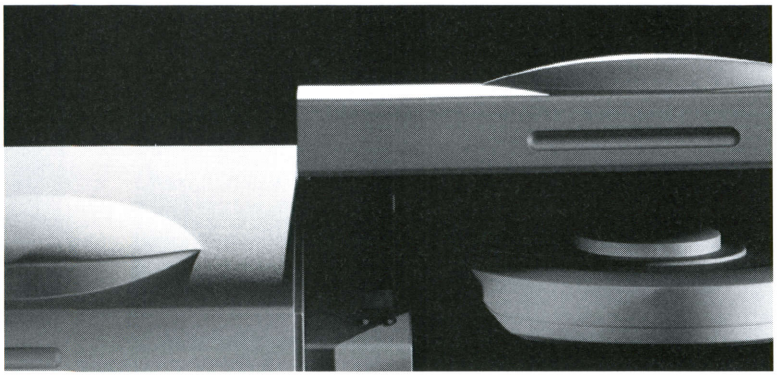
For shots in which the camera swoops and dives, mimicking the POV of a model airplane two of the boys are operating by remote control, the filmmakers used a JimmyJib with a 30' zoom arm and remote-controlled head. (A few dolly shots of the kids were also shot but ended up on the cutting-room floor.)

Some of the warehouse footage was shot with a crane mounted on the back of a pickup truck. "The crane had supposedly been mounted on the back of a tank that was used for a World War II movie," King relates with a chuckle. "It had been moved from the tank to the back of this truck. It was an old rig, but it worked well." The production also used a Chapman Pee-Wee dolly throughout the shoot. Much of the band footage was shot by tracking laterally back-and-forth in front of the musicians.

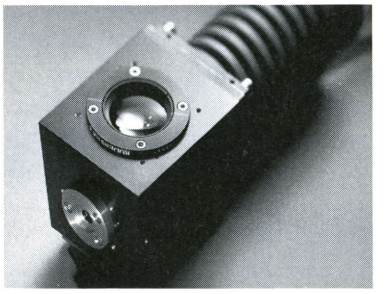
FotoKem handled all of the project's negative processing. The reversal was processed normally at Yale Lab, and all footage was transferred to digital betacam at CCI. "I think a lot of the skip-bleach processes and the other things people are doing to negatives is getting to be a little too much," King observes. "Because we wanted this to have a more straightforward look, we decided to process everything normally." ■

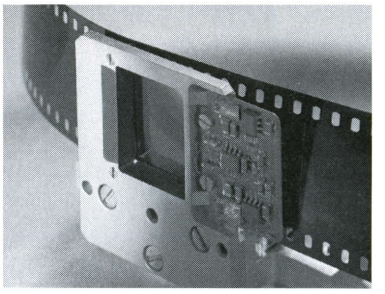
New Products & Services

compiled by Douglas Bankston









Far left: The Arrilaser features 1,000- or 2,000-foot magazines. Near left, top: The highly stable Arrilaser is housed in a cabinet half the size of its laser recorder predecessors. Middle: The combined RGB laser beam is focused onto film using a custom lens designed by Rodenstock. Bottom: The vertical film gate prevents dust from settling onto the film.

The Next Level of Laser Recording

Arriflex, the noted camera and lighting company, has taken a bold step into imagery territory with a laser film recorder known as the Arrilaser, capable of outputting 525-line to 4K-resolution digital images to film. In the past, many laser film recorders were slow, hulking machines with gas lasers that produced an immense amount of heat. Arriflex has bucked tradition and designed a faster, more stable recorder that uses heat-reducing, solid-state lasers, all housed in a cabinet half the size of a normal recorder — with a price to match.

The Arrilaser is made up of the host computer and the actual laser recorder. Digitized footage in the form of image data is loaded from a network connection to the Arrilaser host computer, which can, when necessary, adjust resolution, sharpness or color space. Through the Image Data Interchange (IDI) card located in the host computer, image data is transferred via a fiber-optic cable to the film recorder's linebuffer. The data in the linebuffer is then routed through a Digital-to-Analog Converter to the input of the Acousto-Optical Modulators (AOMs), which modulate the image data onto the unexposed film. After one line is exposed, the film recorder sends a trigger signal to the IDI card in the host computer requesting data for the next line. This procedure is repeated until the whole image is transferred to the film recorder and recorded onto film.

The actual recording of each line of resolution onto film is performed by the three solid-state lasers, one each for the colors red, green and blue. Solid-state lasers, a technological breakthrough over gas lasers, feature a lower power consumption, a higher stability and a longer life expectancy. The three lasers are housed in a separate compartment in the optics module. A graduated neutral density filter attenuates the light of each laser to the required level to finely adjust the Arrilaser to variances in film-stock sensitivity and lab-development processes, as well as to compensate for any long-term drifts in laser energy output. Three AOMs are used to modulate the image information onto the laser beams at the selected pixel rate. Inside each AOM, a laser beam passes through a crystal. The internal grid structure of the crystal deflects the laser beam, which is basically doubled in frequency. By exiting the crystal with a high frequency wave, the grid structure, and thus the intensity of the laser beam, can be varied at a very fast rate pixel by pixel. The entire optics module is mounted on shock absorbers.

After each laser travels its individual pathway through an attenuator, a shutter and finally an AOM, the three lasers are combined and reflected up to the scanner module (or camera) through the use of a mirror for the blue laser and dichroic mirrors for the red and green lasers. Another mirror in the scanner module directs the combined laser beam at a penta prism that rotates at 60,000 revolutions per minute. The single penta prism does not exhibit the shortcomings of the traditional polygon mirrors, such as visible streaks or exposure artifacts resulting from angle deviations or different reflectance values of individual polygon mirror facets. The prism directs the

beam through an fq-lens, custom-designed by Rodenstock, that focuses the beam onto the film plane as the film moves through. The fq-lens focuses the rotating parallel beam onto a flat plane — for each rotation of the penta prism, one line is exposed onto film. Since the film moves sideways relative to the direction of the reflected beam, a complete image is written line by line during exposure.

The film is run through in a vertical orientation from left to right at a constant four-perforation velocity so that dust cannot fall onto the film or lens. A full aperture gate allows for all formats up to 24,576 x 18,672 mm (0.97" x 0.74"), and the film is held steady by dual pin registration. The Arrilaser features 2,000' supply and take-up magazines with frame accurate spooling at 10 frames per second in both forward and reverse, and the take-up has built-in scissors to cut the film when the magazine is removed. An auto-feed mechanism pulls the film from the camera automatically into the take-up magazine with the push of a button when loading.

The Arrilaser has exposure cycle times of 5.2 seconds for a 4K image and 3.3 seconds for a 2K image. The actual exposure time is determined by the rotation speed of the scanner's prism, which rotates once per millisecond, writing one line during the time, compared to the number of lines required for the image. A 4K image has 3,000 lines of resolution. Additional time is added for shuttling the film into place and for monitoring recording parameters.

A calibration system monitors all major parameters, such as the base laser-beam intensity, in regular intervals and automatically re-adjusts when necessary. The system also can adjust all geometric parameters including image position, image size and color convergence. Color-calibration software ensures the gray scale and color values sent to the Arrilaser (expressed as Kodak Cineon code values in the digital image files), resulting in predictable densities on film. The system is calibrated by exposing a row of digitally generated grayscale patches. After that test, film is developed at a laboratory, the density of each patch is measured and the readings are then entered into the host computer, which generates a Look Up Table (LUT). The LUT alters the native system response to achieve the desired calibration behavior. The relationship of the incoming Cineon code values to the recorded densities can be altered to adjust to the sensitometric characteristics of the film's particular emulsion batch, to adjust to lab processing fluctuations, or to take into account personal preferences or special requirements.

The Arrilaser's speed, stability and compact size, as well as its affordability, make it very appealing to post-production houses that are seeking to increase their output without sacrificing image quality. In fact, image quality is much improved over its laser film recording predecessors.

Electron Filmworks in Hollywood, California, better known as EFilm, has had an Arrilaser in house since December. After continuously pushing the laser recorder to its limits, the facility plans on adding many more. "Arri is a filmmaking company," says EFilm owner and CEO Joe Matza. "That's their foundation, and that really meant a lot to us in terms of acquiring the Arri. They understand the demand of the professionals in this business and the turnaround demands of this business in general. They've designed a machine that's built like a Mercedes Benz, and we're very enthused about it. Sharpness, flare, noise – it just makes a finer image."

The Arrilaser figures significantly in the company's goal of becoming a high- volume, high-quality digital laboratory. "If you think of EFilm as being a digital laboratory analogous to what Deluxe and Technicolor are in the photochemical world," Matza offers, "we want to be the same thing in the digital world and still maintain extraordinary quality. I imagine that in two or three years we'll have 10 of these things lined up, so we can work like a digital laboratory and really have super-high volume."

Adds EFilm Technical Director William Feightner, "It's really price performance — the amount the unit costs versus the amount of work it can turn out. That's extremely important for a service bureau, since we run the machines 24 hours a day seven days a week. If the Arrilaser can put out more frames in that length of time versus the amount it costs to purchase and maintain it, then it's a clear winner in those senses over any previous technology. It also has to do with our faith in the company that they're in it for the long run, and we look forward to continued improvements. We push the technology harder than anyone else."

Being at the forefront of the film recording service, EFilm has worked with virtually every kind of film recording technology, beginning with CRT before the inception of laser recording. In fact, EFilm co-developed an EBR electron beam recorder and later worked with AII to develop the LUX laser recorder.

"In that whole lineage," say Feightner, "there have been some big improvements along the way, so the Arrilaser recorder is a natural step in the evolution of film recording technology. Laser recording has really matured. Arri, to date, has done the best job of taming the technology and making it stable. We're working with some of the premiere houses around town, so the quality expectations are extremely high. We stuck our foot out there long ago [by maintaining] that we put out the best and most consistent quality, and the Arri has allowed us to fulfill those needs.

"To be able to feed a machine continuously 24 hours a day at those speeds is no easy feat," he continues. "We have custom-engineered a massive data network, server network and image processing chain, and we run the Arri with our own software. We are running the Arri side by side with the LUX technology, and they basically intercut, which is a testimonial to the quality of the Arri in terms of that it can be calibrated. It makes very exacting pictures, so with our controls and our software it can be made to match just about anything around. By far, the Arri is the most stable piece that we have."

Notes Matza, "I think one of the smart things Arri did was that they looked at the original Lightning [laser recorder] by Kodak and the LUX by AII, and they asked potential customers what kinds of features they would like to see incorporated into a laser recorder. I think they listened well, and they added a lot of their own innovations, too. Laser technology is inherently finicky for all kinds of technical reasons, but you get a very strong sense that Arriflex is behind this product in a big way. That makes all of us who invest in this sort of esoteric technology feel kind of warm and cuddly."

For more information about the Arrilaser laser film recorder, contact product manager Marc Shipman-Mueller at Arri USA Inc., (773) 252-5210, fax (773) 252-8003, e-mail: msmueller@arri.com, Web site: www.arri.com.

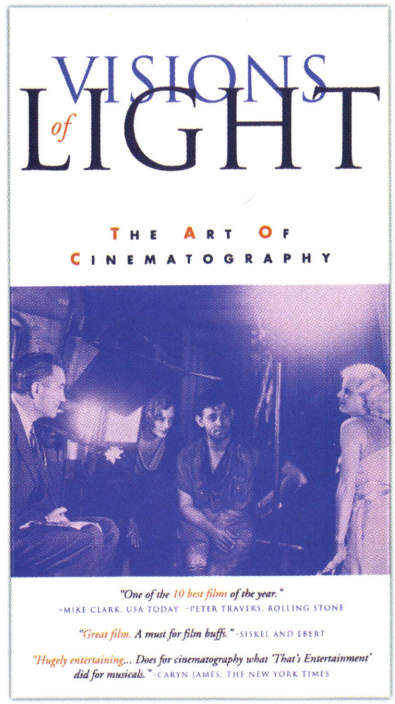
Cintel's New Telecines

With high-definition (HD) looming on the horizon, Cintel has created two products to make standard-definition (SD) imaging as well as HD transfer quality obtainable in CRT-based digital telecine. Using Flying Spot technology, the high-end 21st Century C-Reality and Callisto (an URSA Gold/Diamond upgrade) are designed to meet these challenges.

The C-Reality offers a full, user-selectable range of data scanning from 525-line all the way to 4K resolution. At this year's NAB exposition in Las Vegas, Cintel demonstrated 4K scanning of film at 4096 x 3112 pixels, with scan rates of around one second per frame in a package that will be available for C-Reality users. ➢



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For the first time, the ASC is pleased to offer this incredible 92-minute documentary about the craft of cinematography. This work is also is a history of cinematography and filmmaking, featuring examples of significant advances and highlights culled from the imagery of major cinematographic innovators. Included are more than 100 excerpts from classic films, including *ET: The Extra-Terrestrial, Raging Bull, Birth of a Nation, Citizen Kane, In Cold Blood, The Graduate, Rosemary's Baby* and many others. Among those interviewed are such ASC members as Allen Daviau, Owen Roizman, Conrad Hall, Victor J. Kemper, Vilmos Zsigmond, Gordon Willis, Stephen Burum, Michael Chapman, Caleb Deschanel, William A. Fraker, John Bailey, Néstor Almendros, Charles Rosher Jr., Harry L. Wolf, Charles Lang, Sven Nykuist, Robert Wise, Laszlo Kovacs, James Wong Howe, Haskell Wexler, Vittorio Storaro, John A. Alonzo, Bill Butler, Michael Ballhaus, Frederick Elmes, Sandi Sissell and others. *Visions of Light* is a must-have for the serious film professional, movie buff or cinema student, and would also be a fanastic gift for the cineaste in your life.

(VHS, U.S. format)

The C-Reality handles normal and Super 35mm and 16mm film formats. The precision capstan-driven digital servo system provides extremely stable pictures with run speeds from 5 to 60 frames per second in increments of 0.01 fps and a maximum shuttle speed of 20x. All scanning formats from SD to 4K resolution are generated in full-bandwidth RGB with the option to provide half-bandwidth color in SD and HD. The output pipes for SD and HD are via serial digital, and the data is provided through a POSTware SGI-based data interface file system.

The film-scanning light source is a thick-faceplate, high-intensity CRT with a fine spot size. The alignment of all the CRT coils is fully automated for accurate and repeatable scan geometry and focus through the entire system. For all video and data formats, the digital scan system provides sub pixel X-Y pan and zoom, full-resolution anamorphic unsqueeze and scan aspect control (preset for 4:3 and 16:9), and a selection of scan effects including perspective, 360-degree rotation and X-Y squeeze.

The fully automatic CRT approach to scanning provides noise-free images at whatever resolution is required. The cell box color separation has been optimized to match the latest film stocks, affording excellent color saturation and a signal-to-noise ratio up to 60dB. Dynamic corrections for any phosphor faceplate irregularities are performed by reference cells monitoring the CRT faceplate and will cater a 3:1 reduction of light output at the user-selected beam current. The reference cells used are a repeat of the main video path, down to the color filters used in the cell box. A memory-mapped shading corrector is then used to remove any lens and light-separation errors. This automatic alignment of the CRT correction ensures the repeatability of color in all modes.

The C-Reality's CVIP (Color Vector Image Processor) has a digital channel with full RGB and multi-vector secondary correction. The Primary Color Corrector is adaptable and allows the colorist full artistic control, while logarithmic masking will accurately correct cross color within the film stock. All of the CVIP's six vectors can be used to isolate colors in hue, saturation and luminance with color softness as required. Digital enhancement offers a maximum +12dB horizontal and vertical aperture correction with negative enhancement, or softening, included. For film-mode operation, a pure logarithmic output is available that provides printer-light, film-type controls.

The proven designs and technologies that have gone into the C-Reality have trickled down into the Callisto upgrade for the URSA series of telecine machines for both SD and HD scanning.

These improvements have made several postproduction facilities take notice of — and purchase — the new telecines.



New York-based Manhattan Transfer is preparing for HD by adding a C-Reality and upgrading one of their URSA Diamonds to the Callisto. Says Manhattan Transfer's Vice-President and General Manager Steve Coffey, "We initially felt, with HD supposedly banging on everyone's doors for the past couple of years, that we would closely monitor when it would have that profound impact on the postproduction market. The HD market in the commercial world really hasn't materialized yet. That allowed us some time to let the technology develop. We feel Cintel, with the C-Reality technology, has reached the point where it's stable and gives us, above everything else, unmatched picture quality out of telecine."

Adds Bill Topazio, vice president of engineering, "We felt the need to progress to the next generation of telecine. We're very comfortable with the kind of imaging that we can get off a CRT-based system. We are dealing with a CRT Flying Spot technology, which means that the scan across the film is continuous. It's not predetermined how many pixels are available to you for any given imaging requirement. We feel that the advances in the circuitry driving the CRT has advanced to the point where it can take us not only to HD but also beyond. I can say that I'm very comfortable using the existing C-Reality Flying Spot technology for work higher than HD, simply because it has such precise control over the spot size and the precision of positioning on the CRT."

"This is very important to us," remarks Coffey, "because the bulk of high-end work that comes into Manhattan is through our visual-effects department. Besides the need to deliver an HD product, we want the ability to scan at higher rates when we're involved in visual-effects projects. This is really the focus of our move to this new technology in telecine. We want to capitalize and enhance the product and the work we're doing in the visual-effects department. The C-Reality gives us that [ability].

"We also do a lot of work in the episodic television and feature-film markets," he continues, "and the Callisto, given the way it is priced and offered, allows us to apply [C-Reality technology] to these different markets. It is heavily optioned, so you can add as you move along and wind up at the top end with the function of a C-Reality."

Manhattan Transfer is building a new room to showcase the C-Reality and is modifying the engineering and cosmetics of the room housing the URSA Diamond slated for the Callisto upgrade. Along with the new equipment additions, the post facility is also bringing colorist Clive Christopher aboard from London, England.

"Manhattan Transfer will have new talent and new technology," beams Coffey. "We're really putting a whole new face on the telecine department here."

MTI, another East Coast facility, is also gearing up with the Cintel C-Reality

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advancement. "We've always been a loyal Cintel house from the URSAs all the way to the URSA Diamonds," says Mike Buckner, MTI general manager. "They've always been number one in the film-transfer business as far as the way the film looks — the crispness and the clarity of the pictures coming off their machines. The C-Reality gives us the sharpest image and nicest range of color correction hooked up to the [da Vinci] Renaissance 2K color corrector. When we bought the C-Reality, we felt it was the best HD telecine on the market."

During a month and a half of working with the C-Reality, MTI senior colorist Gary Scarpulli has noticed that his cinematographer clients have been very pleased with the transfer sessions. "They are very impressed with the range," he notes. "Everybody is very impressed with the texture of the picture overall and the fact that it doesn't look over-enhanced. From 16mm right up to high-end 35mm, there is nothing that hasn't worked out perfectly. There isn't anything I feel I can't tackle on this system, whether it's color, contrast or tonality.

"The system is noise-free with no grain and amazing range in the [personal computers] for a variety of exposure situations, [allowing] the transparent reproduction of the filmmaker's vision," he continues. "To me, that is the key: to stay transparent in the process. One of the important considerations for me is to keep the feel very organic. I always like to think of it as something that you see in a magazine or on a wall at a photographic exhibit. With the C-Reality, Cintel has provided resolution clarity with a very organic film feel. I'm actually a little bit more excited to get to work everyday!"

For more information on Cintel's line of telecines, contact the company in the United Kingdom at (44) 1920 463939 or in Valencia, California, at (661) 294-2310.

A Perfect Balance

Vinten Inc. has introduced the Vision 6, a lightweight version of its industry-standard line of Vision heads



and tripods designed to meet the needs of portable digital camera owners. The Vision 6 features Vinten's patented Perfect Balance technology, which allows the camera to be set at any angle and left untouched, without any additional assistance, and also allows smooth movement throughout the tilt range as a result of the consistent counterbalance.

The Vision 6 weighs only 5.5 lbs. and has a full +/- 90° tilt range with illuminated leveling bubble. The counterbalance is infinitely adjustable and the setting remains constant throughout the tilt range. Calibrated drag controls are recessed. The Vision 6 has a payload range of 9.9 to 22 lbs.

Vinten Inc., (888) 2-VINTEN.

Aspect Ratio of Choice

JVC Professional Products Company has unveiled its GY-DV700W switchable aspect ratio digital video camcorder, which features three new ⅔-inch Interline Transfer CCDs and the ability to switch between its native 16:9 aspect ratio and the traditional 4:3. The camcorder has a sensitivity of F11 at 2000 LUX and delivers the equivalent of 750 lines of horizontal resolution. Other features include 14-bit digital signal processing, Full Auto White, Black Stretch/Compression, built-in Genlock, zebra level indicator and JVC's LoLux low- light performance. The camera can be operated in full manual or full auto for convenience.

JVC Digital Broadcast and Professional Systems Division, (800) 582-5825, Web site: www.jvc.com/pro.

Bug Light

K5600, Inc. has made the Joker-Bug 800 HMI Daylight fixture readily available. The small unit is comparable to a 3200/4000-watt quartz fixture but with a power draw of only 12.5 amps. In Bug-Lite mode, meaning with no optics, the main application is in traditional lightbanks and lanterns where the maximum output of the lamp is collected to fill a front screen very evenly. With the Beamer optical accessory, the Bug-Lite



becomes the Joker-bug, a directional Par that offers various beam patterns with quick lens changes of medium, wide flood, super-wide or frosted Fresnel. A clear beaker over the bulb is standard for full light intensity, or a frosted beaker can be used for adjusting the light quality. The fixture has a spot-to-flood ratio of 55 to 1 and beam angles from 5 degrees to 45 degrees. The hot restrikable 800-watt lamp features UV Stop Quartz and weighs only 6 pounds. The entire package with the compact ballast weighs 38.5 pounds. The fixture mount accepts ⅝" baby hardware.

K5600, Inc., (800) 662-5756, Web site: k5600.com.

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Tens of thousands of Internet users have come to the ASC site since its launch in 1997. Excellent content, vivid graphics, well-trafficked forums and regular updates have made the site a "must see" for industry professionals and serious students of film, as well as movie-going fans. But it's only the beginning. Future content will include expanded multimedia journalism covering all aspects of filmmaking — and much much more.

ASC Web Site
The American Society
of Cinematographers
1782 North Orange Drive
Hollywood, CA 90028
In the United States:
(800) 448-0145
Outside the United States:
(323) 969-4333 • fax (323) 876-4973

ActionCam ASN camera support system. The versatile ActionCam supports camera loads of 9 to 50 pounds using the same spring-arm. The system itself, including a 5" monitor, weighs only 26 pounds.

The Stabilizing Arm can boom through a 30" range while absorbing stress of the operator's movements, creating dolly-like steadiness. The ASN accepts Euro-style camera plates, allowing for quick interchanges between a tripod and the ActionCam in seconds. Trimming fore and aft and side to side can be accomplished with the turn of a knob.

The Friction-Free Gimbal offers smooth pan, roll and tilt, and can be positioned wherever required around the post. The control handle is designed to rotate around the axis for more fluid and more natural operation — virtually adding a fourth axis to the gimbal — resulting in more maneuverability.

The ActionCam Sled can be telescoped and dynamically balanced for perfect balancing and comes equipped with a mount for either two NP batteries or one Anton Bauer/PAG. Two green screen NTSC/PAL monitors are available: a standard 5" monitor or an optional high-intensity 5" monitor.

The ActionCam Vest mounts or dismounts with a snap of two rapid action buckles. Simple cross-back construction with built-in lumbar support transfers the weight of the rig away from the wearer's spine and onto the hips and shoulders.

The ActionCam comes with the sled, battery mount, arm, vest, cables, docking bracket, an Allen wrench set and a hard aluminum flight case. As an accessory, the Actioncam has a Universal Low-Mode option.

ActionProducts GmbH, 0041-61-713 80 18, fax 0041-61-713 80 19, e-mail ap-brian@datacomm.ch, Web site: www.actionproducts.ch. ■

Points East

Film Flatters VH1 *Storytellers*

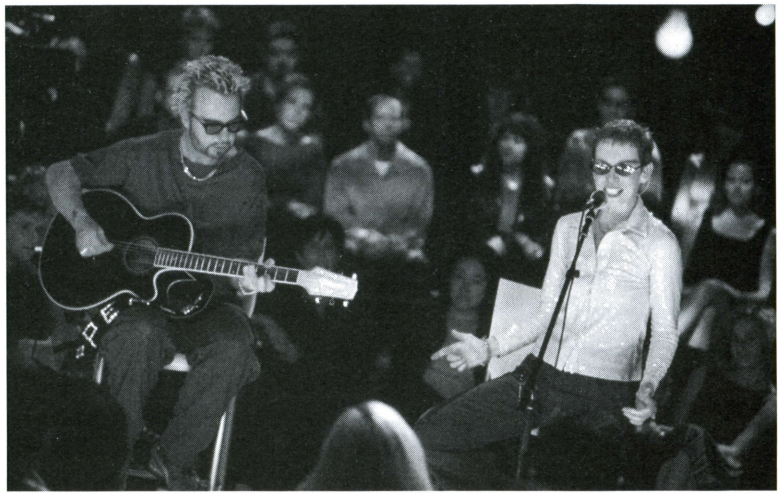
by Eric Rudolph

In an age when video crews seem to be everywhere all the time, creating feature films and programming for voracious cable-television channels, motion-picture film has established a solid if somewhat unlikely new beachhead on VH1's *Storytellers*, an hour-long concert program filmed in New York with multiple 16mm film cameras.

Producing TV programs on film instead of videotape is, according to common wisdom, much more expensive. But Bill Flanagan, senior vice president of VH1 and producer of *Storytellers*, says that's not always the case. "If you shoot on film efficiently and have cooperation from key suppliers, [like we do] with Kodak, the cost differential is a wash," Flanagan observes. "However, if you spend five hours getting an hour's worth of show, film will definitely be more expensive. The trick is to use film wisely."



Photos by Kevin Mazur (Alanis Morissette) and Marc Bryan-Brown (The Eurythmics).

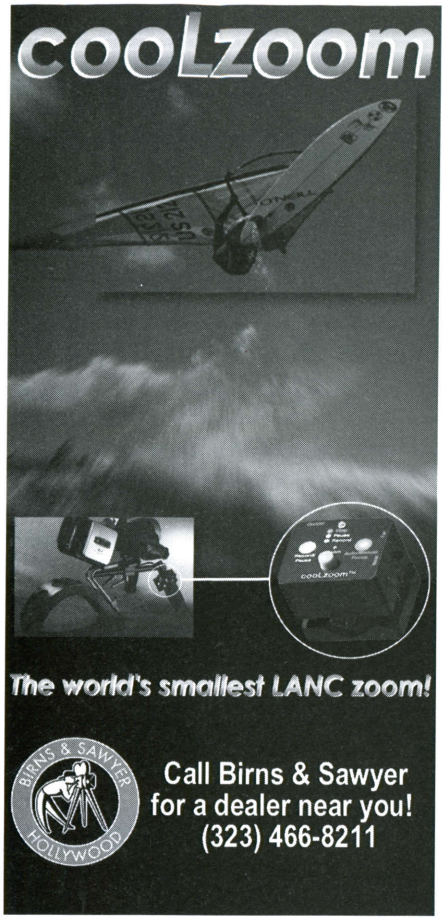


Near left: Taking advantage of the intimate *Storytellers* setting, Dave Stewart and Annie Lennox, a.k.a. The Eurythmics, show off their seamless interplay. Bottom left: Alanis Morissette belts out a passionate vocal.

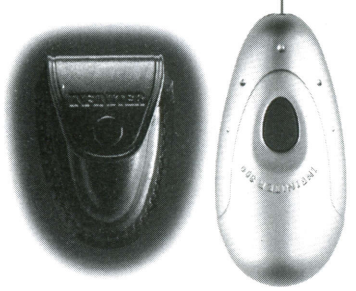
Flanagan explains that each episode of *Storytellers* is culled from about two hours of multi-camera footage and costs about $175,000 to produce. Among the major artists featured during the show's 50-episode, four-season run are Stone Temple Pilots, Steely Dan, Sting and David Bowie. Flanagan says the show's creators were determined from the outset to give it a unique look. "Film just looks beautiful, and we wanted *Storytellers* to look different from every other concert show," he remarks. "The show is not about bringing a concert environment home; it is more about what television does well, [which is] to bring the audience closer to the artists. We work in small environments and the artists are at eye level with the audience."

Although *Storytellers'* creators considered trying video techniques that would approximate the look of film, "we felt strongly that if you can possibly do a show like *Storytellers* on film, you should," Flanagan says, adding that the decision has not been without controversy. "After our first year, we were getting lobbied internally to abandon film because the filming of some of the early shows ran to four hours; the [cost issue] had become debatable. Now, instead of shooting 18 songs, we keep it to 10."

However, Flanagan notes that cost was not the only reason behind the pressure to switch to video. "People [at the network] were saying the show was simply too dark for television, that film gave it a Gothic and spooky feel," he says, noting that *Storytellers* was originally shot on Kodak ISO 100 7248 stock. "Then Kodak introduced the Vision stock, we embraced [Vision 200T 7274], and those critics have been silent ever since. With the Vision film, the shows have a clarity and a visual resonance, a glow as though things are lit from the inside, which we didn't have previously. The fire colors — the reds, yellows and golds — are just so alive. The first show we shot on that stock was with John Fogerty, and his blond hair, tanned Irish skin and blue eyes, along with his red



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bandanna and blue shirt, made for a wonderful look." (Flanagan adds that Kodak's motion-picture division is giving VH1 "a terrific deal" on the film stock.)

Another benefit of using film is that it makes older artists, who comprise about half of the show's talent, look great. Quips Flanagan, "We don't get that harsh, bathroom-light look that you can get on video."

New York-based cinematographer Russell Fine (*Pompatus of Love, Office Killer*), who has served as director of photography on 40 of the 50 *Storytellers* shows, says the Vision stock "lets one see into the shadows a bit more," and notes that the audience has been more brightly lit recently to reduce the presence of large, shadowy areas.

Storytellers is an in-house VH1 production, and as such it will serve as a source of historical footage on seminal acts for years to come. "A lot of VH1's programming consists of licensed material such as film clips and stills, for which we have rights for a limited time," Flanagan notes. "VH1 owns *Storytellers*, and we expect the show to have value for several decades. We sometimes feel like the people who were smart enough to keep film of the Beatles and the Rolling Stones when everyone else was throwing it away!"

Unlike the filming of situation comedies — which utilize multiple cameras configured like video units on TV-style pedestals with handle-mounted zoom and focus controls, and a video tap-monitor instead of a viewfinder — operators on *Storytellers* take a filmmaking approach, composing through the eyepiece. According to Fine, "the focus and timing are so critical that I need to be wrapped around the camera. You can't do moves as precisely or as smoothly looking through a monitor." In addition to operating the A-camera, Fine calls out lighting adjustments and some shot suggestions on the fly.

Fine's A-camera is an Arriflex SR-3 mounted on a Panther dolly along a 65' curved track that starts at one side of the stage and ends at the center; his lens of choice is an 11.5-138mm Canon zoom. Another Arri is located at the back of the room and is equipped with a 200 or 300mm prime. One Aaton camera is handheld, and another is fitted on a Steadicam rig; both have zooms. The fifth camera is another Arri in a fixed location with an 11.5-138mm or 10-100mm zoom. Michael Simon, the show's original director and current consultant, explains that when the show requires a sixth camera, the extra unit is normally placed on another set of dolly tracks.

Two or three loaders prepare the film magazines — the show currently uses 800' loads — and there is a first assistant cameraman to adjust focus for each camera, and sometimes a production assistant to pull cable, as well as dolly grips. The show is shot slightly stopped down, at around T2.8. "We like to keep the depth of field a bit shallow," Fine explains.

Storytellers is notable for its distinctive, soft front lighting, which comes via "a Chimera the size of North Dakota," says Simon. (The show's lighting approach has become so iconic that it was recently adopted for a series of Priceline.com commercials featuring William Shatner on stage, prattling on about the benefits of the online service. Simon says he was even tapped to direct a recent series of the spots.)

Fine notes that this signature look came from the need to produce flattering light from all camera angles. The 4' x 6' daylight Chimera is fitted with a 10K and double diffusion, and the spill is controlled with flags and nets. "This soft front light gives us a flattering look from all angles, and it lets the artists move around within a given area. We also use 440 strips on the stage lip and Source 4 Lekos or 1Ks, especially for backlight, as well as Pars to light the sets."

Fine says he enjoys the hands-on filmmaking approach of *Storytellers*. "On *Storytellers* I often have to do dolly moves for my entire magazine load, which is where shooting this show really starts to be fun — getting into that abstract dream state you achieve using the viewfinder of a film camera." ■

Eric Rudolph can be reached via e-mail at erudolph2@nyc.rr.com.

Books in Review

by Ray Zone

The Directors, Take One: In Their Own Words
by Robert J. Emery
TV Books
352 pps., trade paperback, $20
ISBN 1-57500-087-3

It used to be that young people universally aspired to become movie stars. Nowadays, the general ambition seems to be directing films. All of those who aspire to this lofty cinematic position can find guidance from Robert J. Emery's collection of interviews with contemporary directors, who speak candidly about the joys and difficulties of the profession.

The volume opens with the prolific and gifted Robert Wise, who has won 19 Academy Awards (among 67 nominations) for his work on such classic films as *West Side Story* and *The Sound of Music*. For Wise, the key to directing is good casting and well-planned preproduction. Eighty percent of a director's job, according to Wise, "is having the right actor in the right part." Because shooting time is expensive time, he adds, "Don't ever skimp on preproduction."

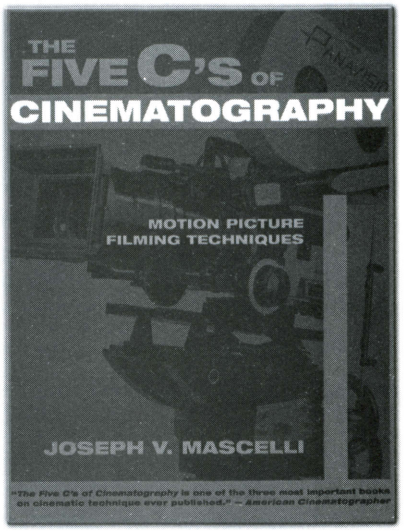
Each chapter opens with a conversational soliloquy by the interview subject, followed by a chronological discussion of each picture in the director's filmography. According to these directors, some pictures almost seem to produce themselves, whereas others are nightmares of difficulty.

The second chapter, in which Ron Howard traces his growth from child actor to one of Hollywood's top directors, is particularly interesting. "I definitely grew up in the business," says Howard, who first appeared in motion pictures at the age of 18 months. Howard's father, Rance, was a veteran character actor who knew his way around a soundstage years before Ron began appearing as Opie on *The Andy Griffith Show*. "My goal had always been to try to direct a feature film while I was still in my teens," says Ron. He got his start with Roger Corman, who promised that if Ron and his father could concoct a car-crash comedy called *Grand Theft Auto*, "he'd let us make that picture."

There are some illuminating observations about cameramen in this book. While filming *Grand Theft Auto* (1977), Howard says, cinematographer Gary Graver "kind of came to my rescue. One day I ended up doing 88 setups with car crashes and stuff, and we wrapped the film on schedule."

Sydney Pollack amusingly relates that while filming his first feature, 1965's *The Slender Thread*, "I was shooting everything from low angles or high angles or between cracks in a door. I would do anything except let the camera sit and let the characters live in the environment of the film." The following year, Pollack worked with James Wong Howe, ASC on *This Property Is Condemned*, and he recalls that Howe "did things nobody else was doing, really, at that particular time in terms of the way he lit and the way he used the lens." Pollack observes that "the most interesting photographs of poverty are black-and-white," partly because "it's very difficult in color not to have it be beautiful."

By contrast, director Norman Jewison has never shot a film in black-and-white and says he's had no desire to do so. "For me, color is emotional," Jewison remarks. John Frankenheimer started out as a camera operator on live television in the 1950s, and he notes that he was very at ease behind the



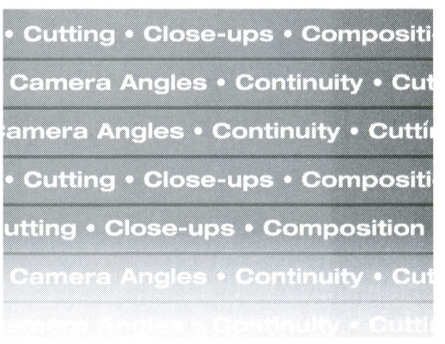
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camera. "It became an extension of me," he says.

In all, 13 directors are profiled in *Take One*, including Spike Lee, Lawrence Kasdan, James Cameron, John Carpenter, David and Jerry Zucker and Jim Abrahams. A second volume, *The Directors, Take Two*, has also been published, and it features 13 more high-powered Hollywood directors.

Minor editing lapses are evident in *Take One*, with the names of actors and other film pros frequently misspelled (for example, Jeanne Craine's surname appears as Crane on p. 246). Despite this, aspiring directors will be amused and informed by these interviews.

The Magnificent Ambersons
BFI Film Classics
V.F. Perkins
BFI Publishing, Distributed by Indiana University Press
80 pps, paper ($10.95)
ISBN 0-85170-373-9

The British Film Institute has published a number of admirable books in recent years. Much of the organization's work is dedicated to the preservation of great films that exist in damaged or incomplete form. Cinema is the lingua franca of the 20th century, and in a cruel irony, it has proven to be an exceedingly fragile medium. The National Film and Television Archive, part of the BFI's collections department, has compiled a list of 360 key works in the history of cinema; the long-term goal of the archive is to build a collection of perfect prints of these films, which will then be screened in a year-round repertory at London's National Film Theatre.

The BFI Film Classics is a series of books created to introduce, interpret and pay homage to these 360 films. Numerous critics and distinguished writers have been invited to write about films of their choice, drawn from the NFTA's list. V.F. Perkins, author of *Film as Film* (Penguin, 1972), has chosen to write about Orson Welles's brilliant but doomed 1942 RKO film *The Magnificent Ambersons.*

Perkins writes insightfully and empathetically about this film, which, as much as any other, embodies the schizophrenic tug-of-war between the mandates of art and business that define the motion-picture industry. In an incisive opening chapter, "Production and Destruction," Perkins writes that "a study of *The Magnificent Ambersons* will keep speaking of it as a ruin and treating it as one of the great tragedies of movie history. I recognize that, in the state to which its owners reduced it, the picture careers between brilliance and banality, its very worst scenes being the ones that RKO Pictures imposed to wrap the story's finish in rose-tinted cellophane. But my main concern will be with Orson Welles's film as one of cinema's glories."

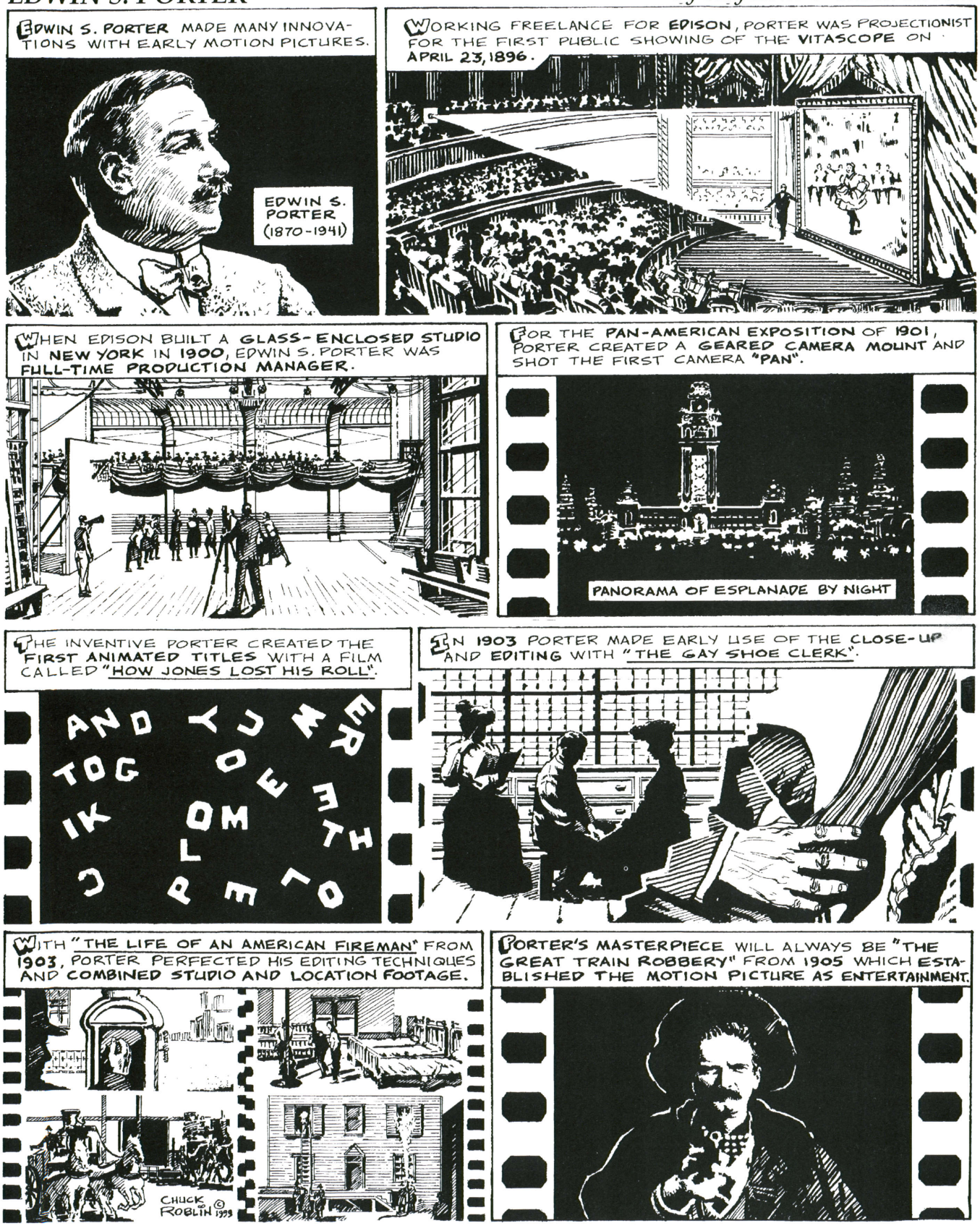
After disastrous preview screenings in Pomona and Pasadena, California, the 131-minute film (photographed by the inimitable Stanley Cortez, ASC) was cut by 50 minutes. New material was filmed without Welles's participation, and the story's ending was changed. Worst of all, none of the excised film was saved. For that reason, this film, like Erich von Stroheim's massively truncated 1924 masterpiece *Greed*, will remain one of the great question marks in film history.

Perkins closes his critical study by articulating a universal wish of film historians everywhere: "On top of a cupboard, at the back of an attic, inside a chest, somewhere with an atmosphere convenient to the survival of the film stock, seven reels are stacked, awaiting discovery, a humble studio hand's gift to posterity. That is a good happy ending. It is not a delusion, but it is better than reality."

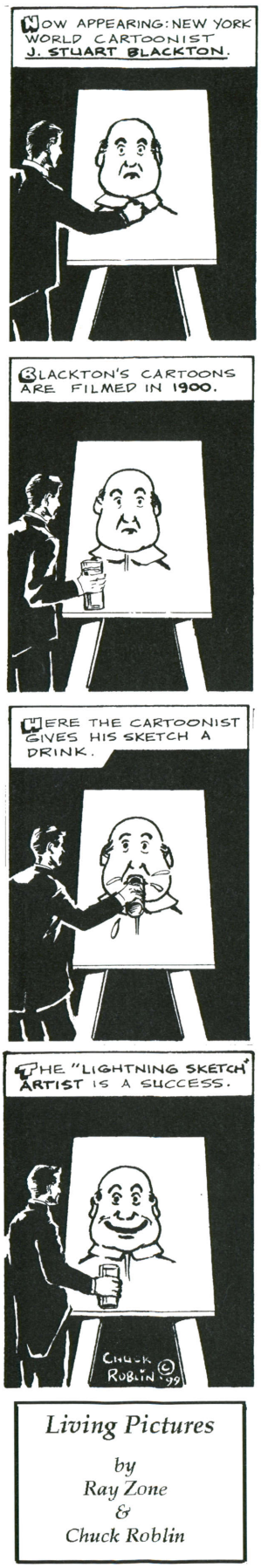
This archival impulse and passion for cinema is evident in all of the BFI Film Classics books, four of which were released early this year. The other three are *Cat People* by Kim Newman, *Fires Were Started* by Brian Winston, and *Shane* by Edward Countryman & Evonne von Heussen-Countryman. These books are handsomely designed, printed on white matte paper, and include many illustrations made from the archive's own prints of the films. ■

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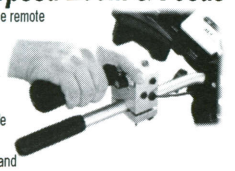
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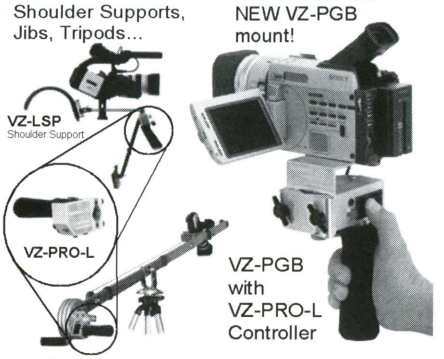
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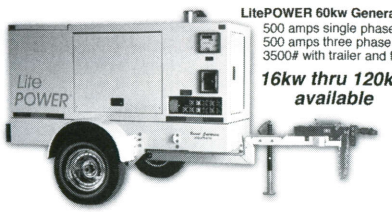
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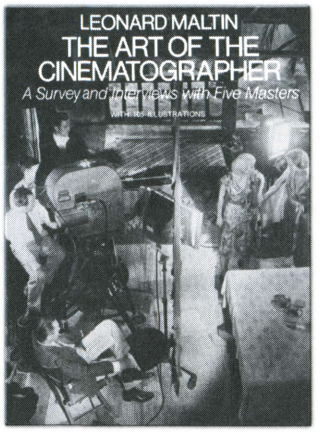
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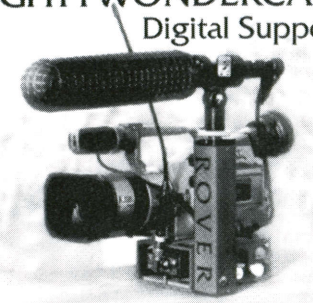
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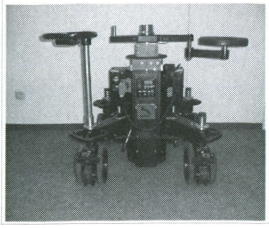
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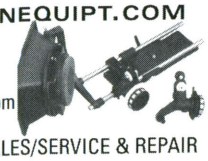
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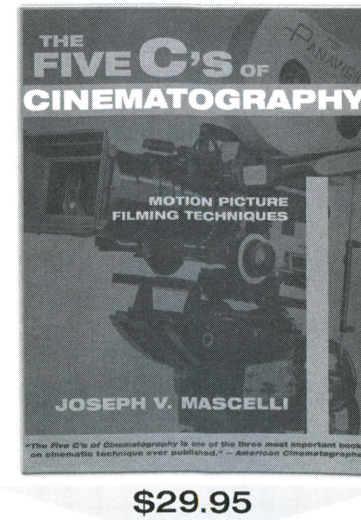
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Lighting *Dances With Wolves* With Dean Semler, ASC, ACS
Program includes Semler discussing and demonstrating:
• Widescreen composition.
• The relationship between lighting design and coverage.
• The best use of high-speed film stocks in low-light situations.
F785 29 min. Producer: AFTRS

Lighting *Dead Poets Society* With John Seale, ASC, ACS
• Seale guides the students and our camera through the lighting setups he used for scenes set in summer, winter, night and day.
• He also divulges tricks and techniques that he uses to achieve extremely difficult effects while maximizing the number of takes each day.
F786 28 min. Producer: AFTRS

Studio Lighting: A Comparative Workshop With Donald McAlpine, ASC, ACS & Denis Lenoir, AFC
Topics include:
• Studio practice
• Lighting design
• Color temperature
• Lighting metering
• Use of practical lamps
F787 59 min. Producer: AFTRS

Location Lighting With Geoff Burton
Topics include:
• Maximum use of natural lighting resources.
• Working with limited space on location.
• How fast stocks and fast work can be critical to success.
F788 29 min. Producer: AFTRS

Shooting for Realism With Allen Daviau, ASC & Sacha Vierny
Program highlights:
• Daviau and Vierny were each given the same script and set to work with, and they share their individual approaches to the problem.
• Computer graphics of the lighting setups as well, as side-by-side comparisons of the finished scenes, illustrate their approaches.
F802 55 min. Producer: AFTRS

Shooting for Drama With Robby Müller, NSC, BVK & Peter James, ASC, ACS, CSC
Program highlights:
• Each cinematographer was given the same script and set constraints. The results were beautiful images that reflect their different backgrounds and philosophies on the art and business of filmmaking.
• The video culminates with a split-screen comparison of each cinematographers finished piece.
F803 55 min. Producer: AFTRS

Shooting for Fantasy With Sacha Vierny & Denis Lenoir
Program highlights:
• Lenoir demonstrates how to use one special effect to hide another.
• Learn how to combine several effects to create magic.
F804 55 min. Producer: AFTRS

Shooting for Black-and-White With Allen Daviau & Denis Lenoir
Program highlights:
• As well as being a storehouse of practical information, this program is an ode to the haunting beauty of black-and-white cinematography and a wonderful essay on the changing art of the cinematographer from the 1920s to the present day.
F805 55 min. Producer: AFTRS

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2000 MAGGIE AWARDS

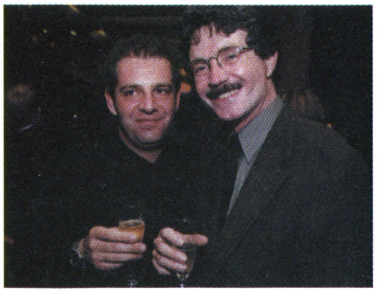
AC Hits Triple at Ceremony











_AC_ and ASC staffers celebrate the magazine's big night at the 2000 Maggie Awards. Top photo, from left to right: accounting manager Mila Basely, staff accountant Sanja Djukelic, administrative assistant Becca Allen, publisher Jim McCullaugh, receptionist Delphine Figueras, executive editor Stephen Pizzello, art director Martha Winterhalter and associate art director Edwin Alpanian. Bottom photos, clockwise from upper left: McCullaugh and Pizzello say a few words at the podium; McCullaugh, Winterhalter and Pizzello show off the hardware; _AC_'s gifted design consultant, Alan Alpanian, enjoys some champagne with McCullaugh; Winterhalter dedicates the Maggie for Best Annual or Semi-Annual Publication to the late George Turner, former _AC_ editor and historical guru, who imbued the ASC Awards Program Book with his knowledge and wit for many years.

This year's Maggie Awards ceremony, held on April 14 at the Westin Hotel in Los Angeles, was a bonanza for *American Cinematographer*. The magazine took home three trophies, including those for Best Overall Trade Publication; Best Communications, Advertising or Entertainment Publication; and Best Annual or Semi-Annual Publication (13th Annual ASC Awards Program Book).

AC also garnered an additional Maggie nomination (Best Interview or Profile) for the February 1999 article "The War Within," which details cinematographer John Toll, ASC's work on *The Thin Red Line*. The piece was penned by executive editor Stephen Pizzello, who has now earned a total of five Maggie nominations for writing (including a Maggie win in 1993).

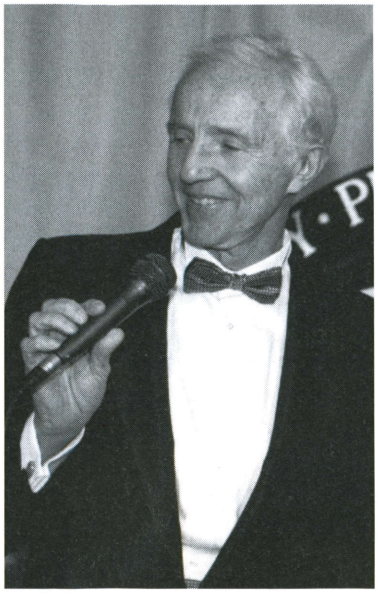
Staged annually by the Western Publications Association, the Maggie Awards recognize editorial and design excellence. More than 2,000 publications competed for this year's 80 trophies, and the event was attended by approximately 725 publishing professionals.

Over the past eight years, *AC* has earned eight Maggie Awards and 21 nominations, but this year marks the first time the publication has won both the overall trade category and its own category. (Other nominees in *AC*'s bracket included *DGA Magazine, ICG Magazine, Mix* and *Written By*). *AC* had previously scored a rare double honor in 1996 by winning both a Maggie Award (Best Communications, Advertising or Entertainment Publication) and a *Folio:* Editorial Excellence Award (Best Entertainment Business Publication). The magazine has now won its Maggie category three times in the last eight years (1993, 1996 and 2000). ■

Photos by Chris Pizzello

From the Clubhouse





Wexler Honored in Taos

Society fellow Haskell Wexler recently participated in the Taos Talking Picture Festival as that celebration's Artist in Residence. Organizers of the film festival, which unspooled April 13-16, selected Wexler because of his activism in the film community and his films' focus on social issues, and presented the great cameraman with an Eagle Award. Through panel discussions and interviews, Wexler discussed how the moving image affects people as a culture. The festival screened his politically charged 1969 film *Medium Cool* and his latest documentary of social activism, *Bus Riders Union*.

Cinematographers Guild Names Short Film Winners

The International Cinematographers Guild (ICG) has announced the winners of its fourth annual Short Film Showcase competition. Taking the top honors were: David Armstrong, *John;* Roberto Blasini, *Leaving Drew;* Ted Chu, *Dominant Seventh;* Mo Flam, *The Transformation;* Russell Harper, *Hotel Soap;* Mark Karen, *Children of the Struggle;* Harris Zambarloukos, *First Daughter;* and Mario Zavala, *Puppies for Sale*. Their films premiered on Sunday, June 4 at the Directors Guild of America Theater and were part of the American Pavilion film showcase at the Cannes International Film Festival.

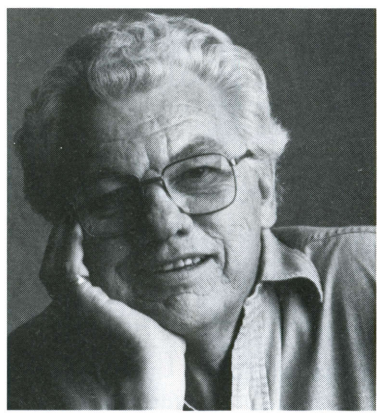
"These eight films bode well for the future of our industry," says ICG national president George Spiro Dibie, ASC. "They are entertaining, engaging and artful, and in each case, the cinematographer played an important role in transforming a script into moving images that tell a story. With all of the hype about technology, it is important to remember that there is a deep reservoir of talented young filmmakers, and they are the real future of this industry."

The competition was open to all ICG members who are not yet rated as directors of photography. The films had to be 30 minutes or less. Approximately 70 entries were judged by a peer group of top cinematographers who evaluated both artistry and execution of craft.

"Film festival juries and media critics traditionally recognize the talent of actors, directors and writers," says Showcase chairman Rob Kositchek, Jr. "Cinematography is frequently noticed in passing and is usually taken for granted. It should receive the same scrutiny as the other disciplines of cinema. It should establish a sense of place and time, amplify moods, and provide a point of view that engages the audience in the story. It usually takes other cinematographers to recognize and appreciate the artistic contributions of their peers."

Dibie says the competition is designed to provide a showcase for talented members of the ICG who are ready to take the next steps on their career paths. He notes that many young filmmakers join the ICG after completing their education, with the idea of learning the craft as camera crew members while being mentored by more experienced cinematographers. Many winners of the three previous Showcases are now working as cinematographers.

"This showcase is more than an important outlet for undiscovered talent," Dibie explains. "It is also a source of hope and inspiration for other young people in our guild and in other sectors of the industry."



Willis Seminars

Legendary director of photography Gordon Willis, ASC will host two special film and video workshops at the School of Visual Arts in New York this month. Focusing on the cinematographer's role as a visual storyteller, Willis will screen and discuss selections of his work, emphasizing the choices made within a frame, from cut to cut and scene to scene. The two-day seminars will be held twice, July 11-12 and July 13-14, from 10 a.m. to 4 p.m. More information is available by contacting the school at (212) 592-2057. ■

WRAP SHOT



Director Richard Fleischer hangs around the inner recesses of the brain aboard a suspended wooden camera platform, which the crew dubbed "Gemini 5." The floating platform was built to facilitate a point-of-view shot of a scientist swimming the length of the cranial fjord through filament-like dendrites.

Creating fantastic realms in motion pictures these days usually leads filmmakers to utter one word: digital. Computers have simplified (in most cases) and eased the construction (in most cases) of such complex environments as, say, the inner workings of the human body. In 1966, long before the luxuries of computer-generated imagery, Cinemascope, DeLuxe Color and some crafty technical artists did just that — journeying through organs, vessels and tissue for 20th Century Fox's science-fiction thriller *Fantastic Voyage*, helmed by accomplished director Richard Fleischer.

A team of doctors and Navy officers inside the small, experimental submarine *Proteus* are miniaturized to microbe size and injected into the neck of Czech scientist Jan Benes, who has defected to the United States — but not before falling victim to an attack from his enemies and sustaining a life-threatening brain injury. The tiny team's mission is to operate from inside the brain using a ruby laser in order to preserve the secrets contained in the scientist's mind.

The outlandish story set in the "inner space" of man was a veritable experiment in color lighting itself. Director of photography Ernest Laszlo, ASC (*Judgment at Nuremberg, Logan's Run*) used a broad palette of color to paint the sets with light. Originally, the immense inner-body sets, which were scaled to precise anatomical proportions, were covered in conventional paints. Laszlo felt the color was lifeless and had the sets reconstructed of translucent materials. Lighting the sets with his colored lamps gave the internal organs a vivid, luminous glow. The technique called for the use of thousands of gel filters covering the entire color spectrum, which had to be changed frequently when they faded from the heat of the high-intensity lamps.

"I've painted with light before in brief sequences," Laszlo told *American Cinematographer* in February of 1966. "I'm sure that *Fantastic Voyage* marks the first time that fully two-thirds of an entire feature has been colored exclusively with light."

For a scene in which the full-scale, 42' x 22' *Proteus* travels along a comparatively sized capillary-tube set, Laszlo poured in golden amber-colored light to simulate the effect of blood plasma. Using huge color wheels, the cinematographer projected onto the translucent capillary walls set's blue-violet "cells" that turn hot pink as they receive oxygen from the bloodstream.

Periodically, the scientific team must don skin-diving suits and venture into the bodily fluids of the injured Benes. Laszlo had to devise methods to make the cast members appear as though they were actually swimming in fluid. Suspending the actors on wires hung from overhead tracks solved the mechanics of the effect. To smooth out the jerky movements of the actors, the cameraman relied on the conventional camera trick of overcranking the camera at 72 frames per second. Of course, he then had to increase the amount of light by nearly three times in order to preserve a satisfactory depth of field. To further accentuate the fluid effect, Laszlo tried out other low-tech gimmicks such as fog, tanks of water in front of the lens and various filters — all contributing to the look of an inner-body excursion.

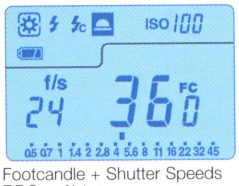
In all, five months were needed to film the live action of the fantastic tale. Another six months were required to complete the special photographic effects. The dazzling imagery garnered Laszlo an Oscar nomination for best color cinematography and earned visual-effects *maestro* Art Cruickshank, ASC an Academy Award for best special visual effects.

"Every picture has its problems," Laszlo noted, "but this is certainly one of the most complex and fascinating films I've ever worked on. We had to experiment constantly as we went along to get the effects we wanted. The result is one of the most satisfying things I've ever done." ■

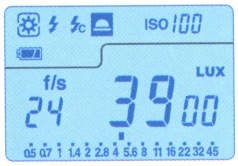
— Douglas Bankston

One Light Meter Can Do It All
New Sekonic L-508 Cine

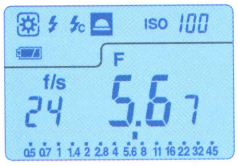
Auto-illuminated LCD displays specialized Cine functions. These are some examples:



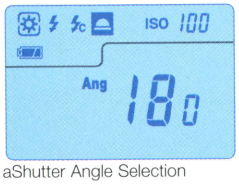
Footcandle + Shutter Speeds F.P.S. + f/stop



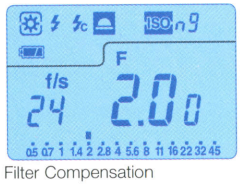
Lux + Shutter Speeds F.P.S. + f/stop



Shutter Speeds F.P.S. + f/stop



aShutter Angle Selection



Filter Compensation

- Zoom Spot 1° to 4°
- Incident
- Footcandle
- Lux
- Footlambert
- Shutter angle
- Filter Factor
- Exposure Compensation
- User Calibration
- Setting Lock
- All Weather
- Flash Metering



SEKONIC®

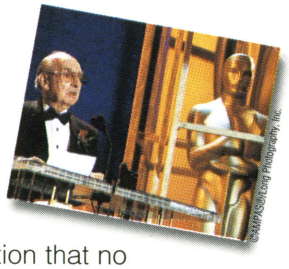
because light is the challenge℠

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